Chugach National Forest Wilderness Area Inventory and Evaluation

Overview of the Wilderness Area Recommendation Process

As part of plan revision, the responsible official, the forest supervisor, shall "identify and evaluate lands that may be suitable for inclusion in the National Wilderness Preservation System and determine whether to recommend any such lands for wilderness designation" (36 CFR 219.7(c)(2)(v), effective May 9, 2012).

Forest Service directives (FSH 1909.12, Chapter 70) for implementing the 2012 Planning Rule provide further guidance on how to complete this process in four steps:

> (1) Identify and inventory all lands that may be suitable for inclusion in the National Wilderness Preservation System
> (2) Evaluate the wilderness characteristics of each area based on a given set of criteria
> (3) The forest supervisor will determine which areas to further analyze in the NEPA process
> (4) The forest supervisor will decide which areas, if any, to recommend for inclusion in the National Wilderness Preservation System

This report provides documentation for the inventory and evaluation steps of this process, and is divided into two sections. The first section provides information about the inventory process and results. These results also include a description of the current conditions and management for vegetation, wildlife, fish, recreation, and access to the Chugach National Forest as they are related to wilderness character. This description is intended to provide a big-picture view of national forest resources and serve as a foundation for the evaluation section. The second section provides an area by area evaluation of wilderness characteristics found in the inventoried lands.

Inventory

The first step in the wilderness recommendation process is to identify and inventory all lands that may be suitable for inclusion in the National Wilderness Preservation System, based on wilderness characteristics defined in the Wilderness Act. To be included in the inventory, lands must meet criteria pertaining to the size and developments within an area. The criteria are defined in Forest Service Handbook 1909.12, Chapter 70 and are listed in appendix A, but are summarized here.

1. Federal ownership and size

Areas included in the inventory must be Federal lands, and be at least 5,000 acres. A smaller area may be considered if it would be practicable to preserve the area in an unimpaired condition.

2. Roads

Exclude areas that contain national forest roads maintained to levels 3, 4 or 5, and maintenance level 2 roads that have received regular maintenance and will continue to be used by the public. Include areas with maintenance level 1 roads or roads that will be reclassified as a maintenance level 1 road, routes scheduled for decommissioning, or historical mining or wagon routes that are part of the cultural landscape of the area.

3. Other developments

In general, lands that meet the size and road development criteria but contain other developments are excluded. However, lands that contain other improvements or evidence of past human activities but are not "substantially noticeable in the area as a whole" are included in the inventory. Also, because the Alaska National Interest Lands Conservation Act (ANILCA) allows for public use cabins and fisheries enhancements in wilderness, these developed sites are not necessarily excluded.

Wilderness Inventory Methods

The Forest Service completed a wilderness inventory, evaluation, and analysis for the Chugach National Forest, culminating in a wilderness recommendation as described in the Revised Land and Resource Management Plan (Forest Plan) Record of Decision (2002) and Wilderness Recommendation Report (2002) as part of the previous plan revision process. The detailed analysis of each of the 16 inventoried roadless areas can be found in Appendix C of the 2002 Forest Plan Final Environmental Impact Statement (FEIS). This process was guided by the 1982 Planning Rule.

The 16 inventoried roadless areas described in Appendix C of the 2002 FEIS were used as the starting point for the current wilderness inventory and evaluation process. Updates to non-Federal lands and developments were made based on information in the Assessment (2014) and the Forest Service GIS database. Inventory criteria was applied to refine the boundaries of the 16 inventoried roadless areas and adjustments were made to account for land conveyances or developments that have occurred since 2002. Additional modifications may be made based on input from the forest supervisor and continued input from the public.

Chugach National Forest Inventory Results

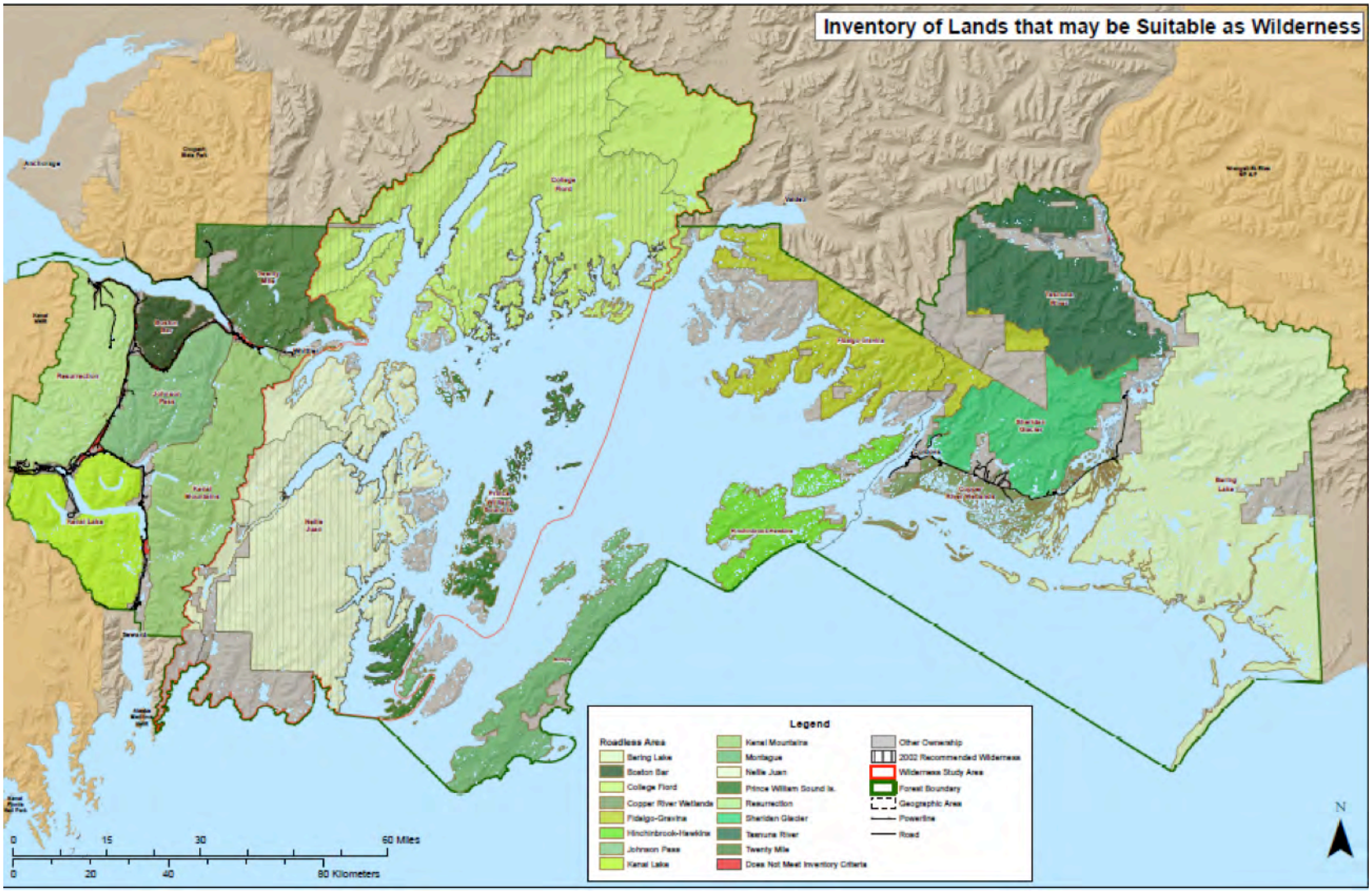
More than 99 percent of the Chugach National Forest, or 5,367,280 acres, are included in this inventory. Their wilderness characteristics are described in the wilderness evaluation section. Table 1 and map 1 show lands included in the inventory. All areas within the Chugach National Forest included in the inventory are greater than 5,000 acres. No buffer was placed between inventoried areas and

improvements. ANILCA authorizes public use cabins in Alaskan wilderness areas, so areas with cabins were also included in the inventory.

The lands excluded from the inventory include approximately 90 miles of roads (including all maintenance level 2 roads), developed utility corridors, and developed recreation sites accessible from the road system. Small areas completely or mostly surrounded by improvements, typically along the Kenai Peninsula road system, were also excluded.

Table 1. Inventory of lands that may be suitable as wilderness, in acres

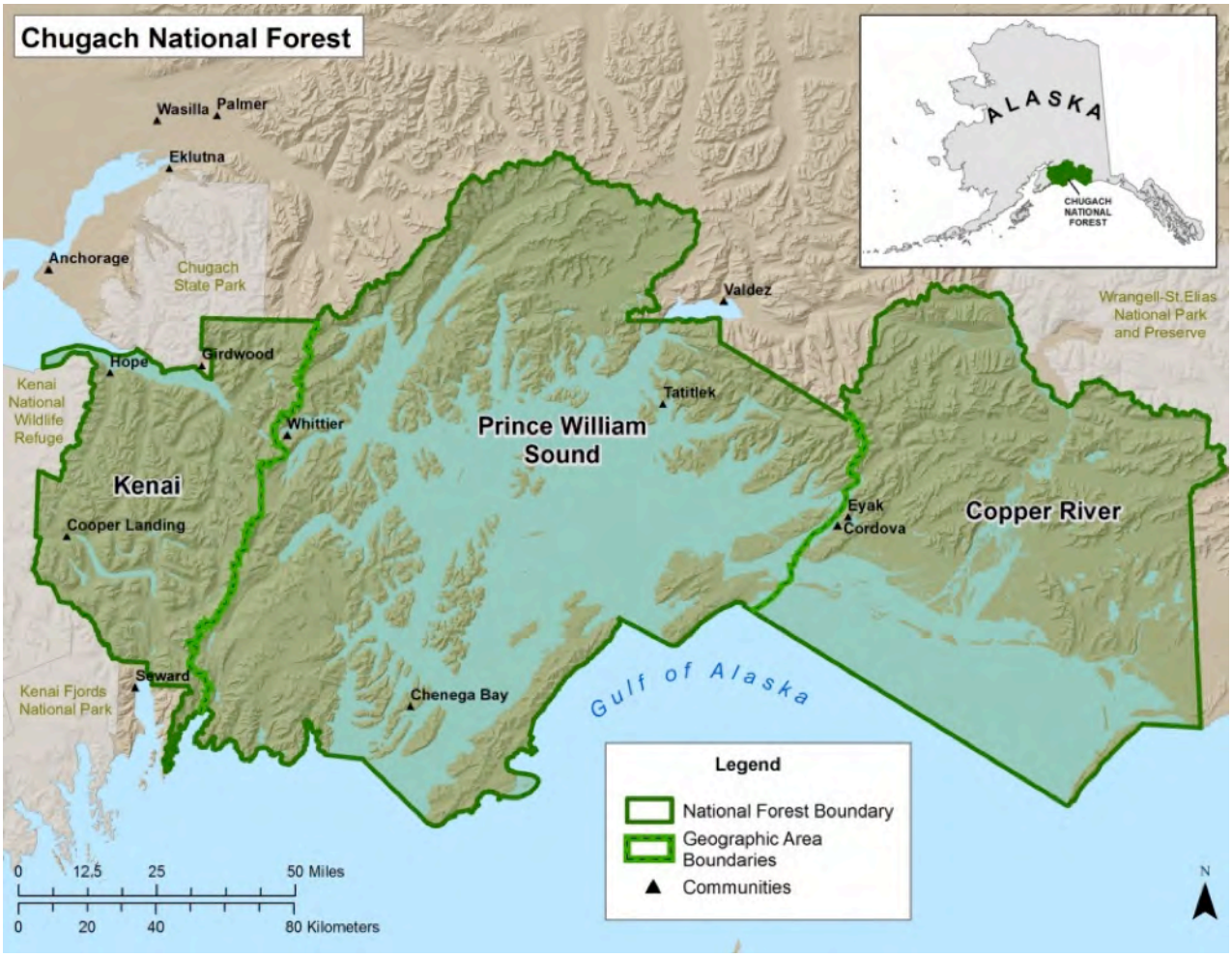
Inventoried Area	Geographic Area	Acres (NFS Lands)
Resurrection	Kenai Peninsula	224,630
Boston Bar	Kenai Peninsula	53,420
Johnson Pass	Kenai Peninsula	152,450
Kenai Lake	Kenai Peninsula	198,040
Kenai Mountains	Kenai Peninsula	306,670
Twentymile	Kenai Peninsula	198,780
Nellie Juan	Prince William Sound	712,820
Prince William Sound Islands	Prince William Sound	120,000
College Fiord	Prince William Sound	1,114,290
Fidalgo-Gravina	Prince William Sound	315,350
Montague Island	Prince William Sound	204,500
Hinchinbrook-Hawkins Islands	Prince William Sound	145,260
Copper River Wetlands	Copper River Delta	87,540
Sheridan Glacier	Copper River Delta	232,230
Bering Lake	Copper River Delta	957,460
Tasnuna River	Copper River Delta	342,920



Map 1. Chugach National Forest lands included in the inventory. More than 99 percent of National Forest System lands may be suitable for wilderness designation.

Inventoried lands resource descriptions

Map 2. Chugach National Forest geographic areas.



Vegetation distribution

Nearly 96 percent (5,184,000 acres) of the Chugach National Forest is managed to allow natural ecological processes to occur with little direct human influence to the vegetation. It is in the remaining 4 percent (216,000 acres), primarily on the Kenai Peninsula, where active management and the largest amount of human uses is focused.

Vegetation composition and structure within the national forest is primarily the result of natural processes. Natural disturbances affecting vegetation include natural fire (ignited by lightning), native insect and disease outbreaks, earthquakes, volcanic ash fall, snow avalanches, landslides, windthrow, glacial action, floods, and beaver activity. Table 2 summarizes the distribution of National Land Cover Database (http://www.mrlc.gov/) class aggregates on National Forest System lands within the inventoried areas.

Table 2. Percentage distribution of National Land Cover Database (http://www.mrlc.gov/) class aggregates on National Forest lands meeting wilderness inventory criteria

Inventoried Area	snow/ice/barren	shrubland	forested	freshwater	herbaceous
Bering Lake	38.3	34.9	15.8	5.4	5.7
Boston Bar	17.4	66.4	15.2	0.4	0.6
College Fiord	67.5	16.3	14.5	1.5	0.3
Copper River Wetlands	3.8	62.4	6.8	8.3	18.7
Fidalgo-Gravina	28.5	31.9	37.5	0.9	1.1
Hinchinbrook-Hawkins Islands	1.8	36.5	59.6	1.6	0.4
Johnson Pass	24.8	61.3	12.6	0.7	0.6
Kenai Lake	18.2	54.5	18	8.5	0.8
Kenai Mountains	64.4	18.5	14.9	1.7	0.5
Montague Island	6.5	41.4	50.9	1	0.2
Nellie Juan	59	18.6	19.8	2.4	0.2
Prince William Sound Islands	2.6	26.6	68	2.7	0.1
Resurrection	10.2	73	15.8	0.7	0.2
Sheridan Glacier	60.9	22.7	13	2.7	0.7
Tasnuna River	80	15.1	3.1	1.3	0.4
Twentymile	52.5	32.7	12.9	1.3	0.6
Forestwide	46	30	19.7	2.7	1.6

Occurrences of non-native invasive plants are increasing, especially in areas of human disturbance (such as road edges, visitor facilities, trailheads, and trails). Forest Service inventory and monitoring data shows that 462 of the 1,594 sites sampled that have non-native plant species are on lands meeting wilderness inventory criteria. Most of these occurrences are near roads or along trails in the Kenai Peninsula and Copper River Delta geographic areas.

In the Copper River Delta geographic area, there is evidence of the invasive aquatic plant, elodea, in several lakes and rivers in the area. It has the potential to crowd creeks and damage wildlife and fish habitat, spreads from broken segments, and can survive when frozen in ice. Once established, it can be difficult to remove and spreads easily by floatplanes, anglers, recreational users, and wildlife. Non-native plants are relatively rare in the Prince William Sound geographic area.

Present forested vegetation in the Kenai Peninsula geographic area partly reflects human-caused fires that have occurred during the last 100 years or so. About 1,400 fires burned a combined 75,000 acres from 1914 to 1997 (Potkin 1997). Human-caused ignitions account for more than 99 percent of these fires.

Tree mortality associated with a spruce bark beetle outbreak on the Kenai Peninsula geographic area resulted in hazardous fuels accumulation in some areas. Management actions have been taken to reduce those accumulations. An average of about 875 acres of hazardous fuels is being treated within the national forest each year. Treatments consist of removal, thinning, pruning, piling, and prescribed burning primarily in the wildland urban interface, high use areas, and along transportation routes.

Wildlife habitat improvement, forest vegetation establishment and improvement, and invasive plant treatment projects also occur within the national forest. Based on data in the Forest Service Activity Tracking System (FACTS) and on file, forest vegetation establishment and improvement acreage ranged from about 200 to 680 acres and invasive plant control from 25 to 120 acres per year from 2004 to 2013.

Very little timber harvest occurs within the national forest. Most of the recent logging occurred during the 1990s on private lands within the national forest boundary, along with salvage harvests following the bark beetle outbreak. Some of the private logged lands are now under Forest Service management, including the surface estate of the Knowles Head Peninsula in eastern Prince William Sound.

Wildlife Resource

This section provides an overview of the condition of wildlife populations by geographic area. A complete confirmation of occupancy and distribution of wildlife within the Chugach National Forest has not been conducted. More detailed information is provided on the condition of natural wildlife processes for a given area where applicable.

The Chugach National Forest provides some of the few places in the United States where all native wildlife associated with the habitats in the inventoried roadless areas are expected to be present in sustainable numbers. These include the dominant predators (AKNHP 2013; ADFG 2006), game and nongame species, and resident and migratory birds (AKNHP 2013). Wildlife are expected to retain natural interactions with each other and their environment and experience the natural processes of competition, predation, migration, hibernation/wintering, breeding, feeding, and sheltering with minimal human interference, except where noted within the geographic area descriptions

None of the native terrestrial wildlife species in these inventoried areas are currently proposed or listed in compliance with the Endangered Species Act (ESA) (61 U.S.C. sec 1531 et sec 107 1973, as amended). None of the state listed endangered wildlife species in Alaska occur in the inventoried areas. As of August 15, 2011, the Alaska Department of Fish and Game (ADF&G) no longer maintains a species of concern list, instead relying on the Wildlife Action Plan (ADFG 2006), which is scheduled for revision in late October 2015. Bald eagles, protected by the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d, 54 Stat. 250), are common in all inventoried areas, particularly along rivers and marine riparian areas. Golden eagles are occasionally present, but are much less common than bald eagles. Several rare birds can be found in inventoried areas within the national forest, including olive sided flycatchers, which are a U.S. Fish and Wildlife Service (USFWS) migratory bird species of management concern and an Alaska state species of conservation concern (ADF&G 2008). Other rare species occurring in inventoried areas of the national forest are mentioned in the individual inventory descriptions. The only bat species known to occur to date, the little brown myotis, has been documented in the Kenai Peninsula geographic area and is likely to occur in other areas in low numbers. This species has been impacted by white nose syndrome across much of its range, was recently listed by the Government of Canada as an endangered species, and is being evaluated for listing by USFWS. White nose syndrome has not yet been documented in Alaska.

Marine mammals are found in salt water adjacent to the national forest and are protected by the Marine Mammal Protection Act of 1972, as amended (16 U.S.C. Chapter 31). Whales, sea lions, seals, porpoises, and sea otters can be observed from many of the inventoried areas, especially in the Prince William Sound geographic area, and enhance the visitor's experience, even though their habitat is outside of National Forest System lands. The western distinct population segment of Steller sea lions is listed as endangered in compliance with ESA (55 FR 49204, November 26, 1990), and federally designated critical habitat has been designated for specific haul outs and rookeries in the Prince William Sound geographic area (58 FR 45269).

Kenai Peninsula

Wildlife species in the inventoried areas of the Kenai Peninsula are currently expected to inhabit appropriate habitat types at sustainable levels. Historic extirpations occurred as a result of overharvest or human-caused habitat conversion, but animals that were extirpated were later re-introduced by humans (caribou), or recolonized naturally (wolves). The Kenai Peninsula now supports most of the native species found in southcentral Alaska. A few non-native species have been documented near the national forest, including garter snakes, earthworms, and house mice, although no definitive surveys have been conducted. These non-native species have not changed the overall function of native ecosystems.

Wildlife are expected to retain natural interactions with each other and their environment and experience the natural processes of competition, predation, migration, hibernation/wintering, breeding, feeding, and sheltering with minimal human interference. However, human development in or adjacent to these inventoried areas could further curtail wildlife movements and genetic interchange. There is a narrow land bridge between Portage Valley and the Kenai Mountains that has the potential to restrict migration and dispersal for some land mammals. Habitats and species in the Kenai Peninsula have particularly high value for scientific research as a result of this genetic bottleneck. Studies of endemism have been conducted on many wildlife species within the Kenai National Wildlife Refuge, indicating the restriction is having some effect on genetic interchange. The Seward Highway and Alaska Railroad are developments that, while outside of the inventoried areas, further constrain wildlife movement and could affect natural processes within the inventoried areas.

Wolves were extirpated from the Kenai Peninsula by 1915 but naturally recolonized by the 1960s and now occur in several areas. Caribou were extirpated from the Kenai Peninsula by 1912 and were reintroduced into two herd areas in 1965 (ADF&G et al. 2003). Ruffed grouse were introduced to the area, but had minimal success. The Kenai Peninsula geographic area provides excellent black and brown bear habitat.

Forest and wetland birds are abundant in this area. Trumpeter swans, terns, and native raptors, including bald eagles and goshawks, are common. The Kenai Peninsula geographic area allows visitors to experience wildlife seldom seen in other places, including both black and brown bears, wolverines, wolves, red fox, Canada lynx, moose, and caribou. Mountain goats and Dall sheep can be found in close proximity in the Kenai Peninsula inventoried areas. Martens, marmots, mink, several weasels, and many small rodents are present. All three species of ptarmigan (willow, rock, and white-tailed) can be observed in the Kenai Peninsula geographic area.

Human activities have the potential of impacting wildlife in the inventoried areas of the Kenai Peninsula geographic area. Moose, caribou, brown and black bears, mountain goats, and Dall sheep are particularly vulnerable to winter recreational activity in the inventoried areas. Many animals in winter are less mobile, or may be confined to dens or are hibernating. Their food supplies may be limited, and they also are using energy to maintain body temperatures, avoid predators, and hunt prey. In some cases, additional disturbance from humans can increase wildlife energy requirements or cause displacement to the extent that natural survival or reproduction processes are compromised.

Prince William Sound

Wildlife in the inventoried areas of the Prince William Sound geographic area are expected to inhabit appropriate habitat types in sustainable levels. Some mammals are naturally absent on the more isolated islands. The lack of predatory mammals makes some of the islands a protected sanctuary for nesting birds. Most of the 220 species of birds, 30 species of land mammals, and a dozen marine mammals can be observed from the Prince William Sound inventoried areas. The marine islands and shoreline provide exceptional habitat for riparian, fresh water, and marine birds. Wildlife are expected to retain natural

interactions with each other and their environment and experience the natural processes of competition, predation, migration, hibernation/wintering, breeding, feeding and sheltering with minimal human interference. Sea mammals are common in marine waters adjacent to the national forest, and ADF&G (2015a) states many of them reach their greatest numbers in the marine waters of Prince William Sound. Bald eagles are very common. Steller sea lion critical habitat (58 FR 4526 August 27, 1993) has been designated for specific rookeries and haulouts within the national forest in Prince William Sound (50 CFR 226.202). Islands and shorelines in this geographic area provide breeding and feeding habitat for several birds on the Regional Forester's Sensitive Species list, including Kittlitz's murrelets, which live at the base of glacial till and in other areas, and black oystercatchers that live on rocky beaches along the shoreline. The Prince William Sound geographic area is a major breeding area for black oystercatchers (Pacific Coast Joint Venture, 2003), and ranked "yellow," or a species with "moderate need," according to the Alaska Species Ranking System (2012).

Non-native blue and silver foxes and off-site native furbearers were introduced to the islands of the Prince William Sound in the late 1700s through the early 1900s for the purpose of eventual harvest. Rabbits and other prey species were also introduced to provide food for introduced fur-bearers. Most of the off-site furbearers and prey died out due to disease and overutilization of their habitat. Sitka deer, an important game species, were introduced to Hawkins and Hinchinbrook from southeast Alaska in several transplants between 1916 and 1923 and have swum to many islands throughout this geographic area. This population is at the species' most northern range, and periodically experience significant population declines due to snow and severe winters, so ecological impacts of these off-site mammals may be less than the off-site deer documented farther south. European black slugs (*Arion* spp) have been expanding into the Prince William Sound geographic area, although no definitive surveys have been conducted. Identification of *Arion* spp slugs is difficult and some species interbreed. *Arion rufus* interbreeding with the more invasive and potentially damaging *Arion vulgaris* has resulted in increased tolerance to cold (at least in domestic crop areas where their impacts have been studied). All *Arion* spp have the potential to rapidly expand in new habitats and alter natural ecology.

The Exxon Valdez Oil Spill (EVOS) oiled the northwestern and western portions of this geographic area in 1986, but many of the affected wildlife have recovered or are recovering (EVOS TC 2014). Pigeon guillemots and marbled murrelets have not. Pigeon guillemot populations are far less than historic levels (EVOS TC 2015). An EVOS-funded USFWS project to reduce mink on the Naked Island Group was initiated in 2014 to help restore pigeon guillemots and help restore a more natural balance. Some subsurface oil remains. Specific EVOS effects on the natural wildlife processes are noted in the individual inventoried areas.

Marine debris is a common issue in Prince William Sound, particularly along the southern coastal areas of Montague, Hinchinbrook, Hawkins, and Kayak Islands. In addition to a steady supply of fishing and other debris, the 2011 Japanese earthquake and tsunami swept an estimated 5 million tons of debris into the Pacific Ocean. An estimated 70 percent sank, but Alaska Division of Environmental Health reports that 1.5 million tons are moving across the ocean with winds and currents. Some of the materials are hazardous. Many bottles and drums are not labeled. Possibly the greatest impact to wildlife is the breakdown of plastics that are mistaken by sea birds and animals as food. Ingestion of plastics can cause wildlife to starve to death with a stomach full of indigestible plastic. Clean-up and storage of these materials will be difficult due to the high winds and rough coastline, but leaving them on site has the potential to alter natural processes and ecological functions. Changes to wildlife or natural processes from this are still unknown.

Human activities have the potential of impacting natural wildlife processes in the Prince William Sound geographic area. A Forest Service study identified 19 areas making up less than one percent of the

coastline, as primary hot spots with a convergence of sensitive resources and high levels of recreational activity (Poe and Suring 2010). An additional 13 percent of the coastline was identified as secondary hot spots. The study suggested the potential for active recreation management may be needed to mitigate impacts to sensitive wildlife areas. Nesting sea and shorebirds are particularly vulnerable to human activities during their crucial breeding period. Human activities that displace sea mammals from haul outs or rookeries can reduce their survival and reproduction. Fishing, hunting, and recreational access has increased with the building and improvements to the Anton Anderson Memorial Tunnel, commonly referred to as the Whittier tunnel. Anecdotal reports from the public and staff indicate black bears are seldom seen in areas where they were formerly common. Black bear harvests levels and reducing skull sizes in game management unit (GMU) 6 suggest there may be concerns about population declines, possibly related to increased access and harvest.

Copper River Delta

Wildlife in the inventoried areas of the Copper River Delta geographic area are currently expected to inhabit appropriate habitat types in sustainable levels, although some mammals are naturally absent on some of the islands. The lack of predatory mammals makes some of the smaller islands a protected sanctuary for nesting birds and sea mammals. The marine islands and shoreline provide exceptional habitat for riparian, fresh water, and marine birds. Wildlife are expected to retain natural interactions with each other and their environment and experience the natural processes of competition, predation, migration, hibernation/wintering, breeding, feeding, and sheltering with minimal human interference.

The entire breeding population of dusky Canada geese occurs on or adjacent to the Copper River Delta. Research on dusky Canada geese has been conducted for decades and documents this subspecies response to earthquake habitat changes, overhunting, and successional change, making a significant contribution to the scientific literature. Their numbers and distribution were severely decreased by overhunting in the early 1900s and they lost the majority of their breeding habitat during the 1964 earthquake and coastal uplift. The Forest Service has partnered with many agencies for several decades to install and maintain artificial nesting islands to improve their numbers.

Boreal toads have been documented in the Copper River Delta and scattered locations in the Prince William Sound geographic area. Rusty black birds are a common species that is apparently declining in Alaska and range-wide (D. Tessler, personal communication February 18, 2015). A significant decline in common species can have a greater ecological effect than similar percent declines in rarer animals. It is currently not known if these declines are related to human or natural causes.

Moose are native to southcentral Alaska, but much of the Copper River Delta geographic area was inaccessible to moose due to geographic barriers. Moose from elsewhere in southcentral Alaska were introduced to Cordova and now maintain a resident population that sustains a regular hunting harvest. European black slugs (*Arion* spp) were first noted within the boundaries of the national forest in Cordova, where they are becoming more common, and have also been incidentally documented in scattered locations of Prince William Sound. Identification of *Arion* spp slugs is difficult and some species interbreed, but all *Arion* spp have the potential to rapidly expand in new habitats and alter natural ecology.

The Copper River Delta is fed by six glacial river systems and is known as one of the world's most important estuaries. Millions of shorebirds, predominantly spotted sandpipers and dunlins, migrate north through the Copper River Delta in spring. They migrate across a wider swath in the fall when they move south. Although these migrating birds are in the area for a short period of time, the migration stops are essential for their successful breeding season and to sustain their long journey to their wintering areas in South and Central America. The lakes and wetlands support hundreds of wintering trumpeter swans. Sea

mammals are present in the Gulf of Alaska waters making up the western boundaries of the Copper River Delta geographic area. Sea otters are commonly observed adjacent to National Forest System lands. There are seal and Steller sea lion haul outs on these uplands but no formally designated critical habitat in this geographic area. Bald eagles are extremely common. Human activities in the roadless areas of the Copper River Delta geographic area have the potential to displace migratory birds during important feeding bouts and displace beach nesting species from their young during rearing periods. Human activities in winter can increase energy requirements for moose. Activities near mountain goats in winter can deter them from predator-safe areas and increase energy requirements during the season when food is limited. It is unknown whether current recreational use has altered natural wildlife processes in this area.

Fish Resource

The naturalness of a particular inventoried area is influenced by the diversity of the salmon populations and also the level of nutrients they supply to both aquatic and terrestrial ecosystems. Fish species other than salmon also play a major role in the natural state of Chugach National Forest watersheds. Dolly Varden char, rainbow trout, and cutthroat trout occur in various watersheds. In some cases these species occur alongside salmon, and in other locations, they exist in isolation above waterfalls that salmon cannot pass.

The Forest Service has developed a provisional list of salmon populations for Chugach National Forest watersheds. In this evaluation, the number of populations for each species has been summarized by inventoried study area (see table 3). From this summary it is evident that there is considerable variation in species composition among the inventoried areas. There is also much variation in the number of populations among inventoried areas. While other fish species are present in all of these areas, salmon are probably the best general indicator of inventoried area condition and character from the aquatic standpoint.

Table 3. Number of salmon populations estimated for each inventoried study area by species

Inventoried Area	Chinook	Coho	Sockeye	Pink	Chum	Total
Bering Lake	3	20	19	8	4	54
Boston Bar	1	3	1	3	2	10
College Fiord	2	10	7	62	48	129
Copper River Wetlands	0	6	3	5	4	18
Fidalgo-Gravina	0	12	3	64	50	129
Hinchinbrook-Hawkins Islands	0	15	3	45	34	97
Johnson Pass	2	3	3	0	0	8
Kenai Lake	7	11	9	4	3	34
Kenai Mountains	1	6	6	1	0	14
Montague	0	17	3	59	40	119
Nellie Juan	2	10	16	57	42	127
Prince William Sound Islands	0	5	3	27	14	49
Resurrection	3	3	1	2	1	10
Sheridan Glacier	0	6	6	2	3	17
Twentymile	2	5	5	3	4	19
Tasnuna	2	3	2	0	0	7

While variable among different areas, the primary human-caused impacts on inventoried area ecosystems can be categorized as: land use, indirect fishery effects, and indirect effects of hatchery fish. These factors have impacted the condition of fish populations and their associated habitats and thereby the degree of inventoried area naturalness. A general summary is provided here with more detail added in the area specific sections that follow.

Land use impacts

In general, the impact of human activities on the habitats of the Chugach National Forest has been light compared to other national forests. However, there are locations where former gold mining operations had adverse impacts on channel and watershed function. In addition, other problems exist with regard to destruction of riparian vegetation from ATV and foot traffic, fragmentation of watersheds due to road crossings, and hydropower development.

Indirect fishery impacts

Salmon, char, and trout are all caught in sport and commercial fisheries. As a result, a portion of each year's production is removed prior to spawning. It is not clear what the long-term ecological impact may be of fewer salmon carcasses on the spawning grounds as a result of these fisheries. However, one consequence is a reduction in the level of marine derived nutrients into aquatic and terrestrial ecosystems compared to historical times.

Indirect effects of hatchery fish

Hatchery fish are common in Prince William Sound and the lower Kenai Peninsula. A number of studies on coho, Chinook, and steelhead have demonstrated that hatchery and wild fish spawning under natural conditions differ considerably in their relative ability to produce surviving offspring (Araki et al. 2008; Buhle et al. 2009; Chilcote 2011; Leider et al. 1990). Although similar studies have yet to be conducted in

Alaska, it is likely the same impacts exist. Naturally spawning hatchery fish have the potential to alter the genetic diversity of wild populations and lower their overall productivity. To conserve the long-term genetic character and productivity of natural populations, several authors have suggested that hatchery fish should comprise no more than 5 to 10 percent of the spawners in natural streams (the remaining 90 to 95 percent being wild fish) (Ford 2002; Mobrand et al. 2005).

In addition to salmon, hatchery rainbow trout (non-anadromous) are released into Carter and Rainbow Lake within the Kenai Lake study area and Vagt Lake within the Kenai Mountain study area. Hatchery fish are released into other small lakes in the Kenai Peninsula geographic area; however, these lakes occur within the developed corridor and therefore are excluded from this evaluation. These hatchery trout are released to enhance recreational fisheries, and, in most cases, they are genetically sterile (triploid), thus they are cannot reproduce nor establish self-sustaining populations that might compete with wild species.

Recreation

The inventoried areas offer a wide range of recreation opportunities and settings, ranging from developed trails near highways to remote locations where access is limited to boat or plane. More than 500 miles of trails facilitate access into the undeveloped backcountry of the Chugach National Forest. With the exception of 42 cabins across the national forest, there are very few developed recreation sites outside of the road system; nearly 99 percent of the national forest falls into the primitive or semi-primitive Recreation Opportunity Spectrum class settings. Very little of the inventoried area is open to summer motor vehicle use, while in the winter more than half of the national forest is open to motor vehicle recreational use. Helicopter-assisted skiing occurs on portions of the Kenai Peninsula and Copper River Delta inventoried areas. Air traffic is common over much of the landscape, with greater activity along common flight paths on the Kenai Peninsula and upper Prince William Sound.

Recreation settings in the Kenai Peninsula inventoried areas range from areas of development and higher concentrations of people near roads that make up area boundaries and along trail corridors where solitude is less common, to remote, undeveloped areas in the backcountry with little use and no development. Compared to the other two geographic areas, the Kenai Peninsula has a substantial infrastructure and sees the most guided and non-guided recreational use. There is also the greatest variety of recreational activities here, including mountain biking, hiking, fishing, hunting, camping, horseback riding in the summer, backcountry skiing, and snowmachining.

Prince William Sound inventoried areas provide primitive and semi-primitive recreation settings. Access is by watercraft from nearby towns, floatplane or helicopter, and recreation settings are generally undeveloped and dispersed. The western half of Prince William Sound includes the 2.1 million acre Nellie Juan-College Fiord WSA designated in 1980, which is managed to maintain the area's wilderness character, including providing opportunities for solitude and primitive-style recreation. Motorized boating comprises the majority of use in Prince William Sound, though it is also a destination for day and multi-day sea kayaking trips. Cabins are found along the shoreline and near freshwater lakes. For many, the marine waters serve as a setting for recreation, with uplands used by hunters, campers, researchers, educators, and more than 30 outfitters and guides. Locations closer to gateway communities of Whittier, Valdez, and Cordova see more recreational use than the more remote areas of Prince William Sound. Commercial vessel traffic is extensive during the summer, including the commercial fishing fleet, ferries, and cruise ships.

The Copper River Delta is much like Prince William Sound in that it is undeveloped and remote with extensive primitive and semi-primitive recreation opportunities. Vast areas in the Copper River Delta are only accessed by boat or float plane. Developed facilities include six public use cabins spread out across the area, with only three cabins accessible by trail. Trails and easements beginning along the road system

and along the Copper River provide access to the backcountry, and the national forest's largest area open to recreational summer motor vehicle use is found in this area.

Geographic Area	Trails (Miles)	Cabins
Kenai Peninsula	401	20
Copper River Delta	88	6
Prince William Sound	28	16
Totals	517	42

Table 4. Recreation Opportunity Spectrum (ROS) classes by geographic area in acres

ROS Class	Kenai Peninsula	Prince William Sound	Copper River Delta	Totals
Primitive (P)	5,952	1,166,189	1,334,973	2,507,114
Semi-primitive non-motorized (SPNM)	198,008	1,335,090	19,818	1,552,916
Semi-primitive non-motorized (winter motor vehicle use allowed) (SPNMA)	523,588	83,341	112,760	719,689
Semi-primitive motor vehicle use allowed (SPM)	365,329	22,011	189,702	577,042
Roaded natural (RN)	70,611	569	17,164	88,344

The Chugach National Forest Access Management Plan, which is included in the 2002 Forest Plan, defines where motor vehicles of different kinds are allowed within the national forest, including off highway vehicles, helicopters, and airplanes. In general, the national forest is open to motor vehicle access in the winter unless specifically closed through a special order, while it is closed to motor vehicle access in the summer unless specifically allowed and displayed on the national forest motor vehicle use maps. As directed by ANILCA, motor vehicle access for subsistence is generally allowed anywhere on the Chugach National Forest, summer or winter, except for the Power Creek area near Cordova. Snowmachines are also allowed in the WSA for subsistence and traditional activities. The two tables that follow provide further detail on lands open to motor vehicle use by season.

Table 5. Summer motor vehicle access within the Chugach National Forest (acres)

Type of Access	Geographic Area			Totals
	Kenai Peninsula	Prince William Sound	Copper River Delta	
Open to all motor vehicle use	0	94	163,323	163,417
Open to helicopters, closed to OHVs	257,264	5,022	421,052	683,338
Open to motor vehicle use in non-vegetated areas only	0	6,607	27,356	33,963
Open to motor vehicle use on designated routes only, open to helicopters	156,662	10,287	52	167,001
Totals	413,926	22,010	611,783	1,047,719

Table 6. Winter motor vehicle access within the Chugach National Forest (acres)

Type of Access	Geographic Area			Totals
	Kenai Peninsula	Prince William Sound	Copper River Delta	
Open to all motor vehicle use	691,864	237,163	1,175,772	2,104,799
Open to snowmachines, closed to helicopters	0	0	389,602	389,602
Open to all motor vehicle use until March 31 (closed after March 31)	9,216	0	0	9,216
Open to helicopters, closed to snowmachines	23,340	0	0	23,340
Season on/season off; alternating year motor vehicle/non-motorized use	153,661	0	0	153,661
Totals	878,081	237,163	1,565,374	2,680,618

Evaluation

The purpose of the evaluation step is to evaluate the wilderness characteristics of all of the lands included in the inventory. Information gathered in the evaluation is used to help determine which lands to carry forward as recommended wilderness in one or more alternatives in the forest plan EIS. The criteria are defined in Forest Service Handbook 1909.12, Chapter 70 and are summarized below. These criteria, like the ones used for the inventory above, are based on language in the Wilderness Act, and describe the qualities of wilderness character. To determine potential suitability for inclusion in the National Wilderness Preservation System, the interdisciplinary team evaluated each area using the following outline

1. Apparent naturalness:

- Do overall ecological conditions appear to be functioning in a way where human intervention and developments are substantially unnoticeable?
- Determine if plant and animal communities appear natural. Included are descriptions of fish, wildlife, and vegetation for each area.

2. The degree of outstanding opportunities for solitude or for a primitive and unconfined type of recreation:

- Identify impacts that influence opportunities for solitude. Considered are the amount and distance from developments and high use areas, topography, screening, and sights and sounds from outside the area.
- Opportunity for primitive or unconfined recreation. The evaluation includes an overview of ROS setting, types of development, diversity of primitive-type recreation opportunities, and current management direction for motor vehicle recreation within the area.

3. The degree to which the area may contain ecological, geological, or other features of scientific, educational, scenic, or historical value:

- These qualities correspond to the other purposes of wilderness as described in the Wilderness Act.

4. Ability to manage the area as wilderness, including:

- Shape and configuration of the area
- Management of adjacent lands
- The presence and amount of non-Federal land in the area
- Legally established rights or uses within the area, including mining activity
- Specific Federal or state laws that may be relevant to availability of the area for wilderness or the ability to manage the area to protect wilderness characteristics

To facilitate the evaluation, the inventoried lands were divided into the same areas used in the previous wilderness evaluation in 2002. The boundaries of these areas, however, changed slightly due to the removal of a buffer between the potential wilderness area and developments, as well as land conveyances and new developments since 2002. The amount of detail varies from area to area based on the amount of available information in the assessment and other studies completed since the previous wilderness evaluation. For example, lands within the Nellie Juan-College Fiord Wilderness Study Area are the only areas that have specifically been monitored for trends in wilderness character as part of forest plan monitoring, so the description provided for three inventoried areas within the wilderness study area, Nellie Juan, Prince William Sound Islands, and College Fiord, is relatively more thorough. Because this evaluation includes more than 5 million acres, it is necessarily broad in scope. For more detailed information on any of the resources, refer to the plan assessment (USDA 2014) available on the Chugach National Forest website.

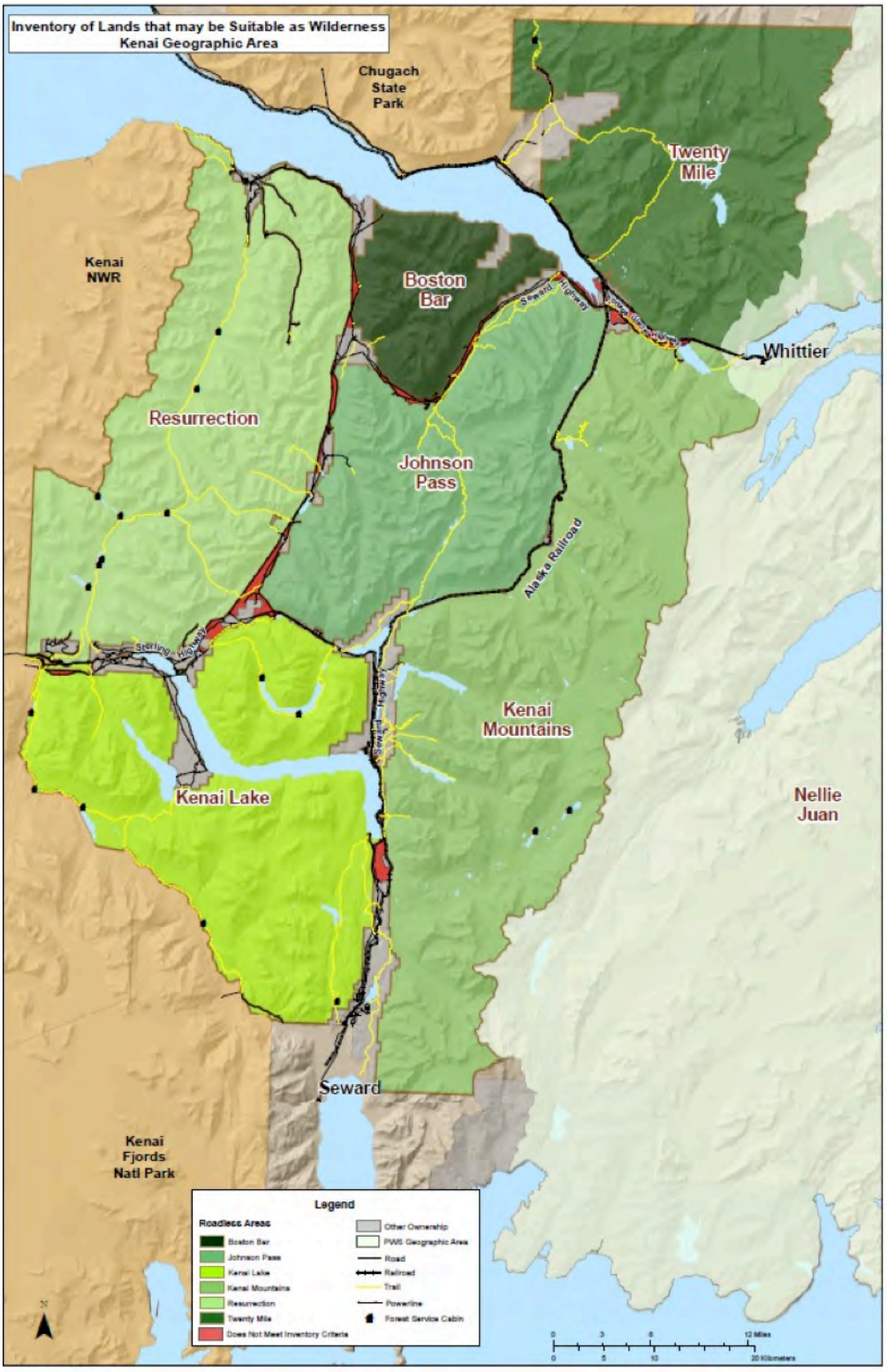
Table7. Chugach National Forest Wilderness Evaluation Summary, by inventoried area

Inventoried Area	Geographic Area	Acres (NFS Lands)	Attributes Supporting Wilderness Suitability	Limitations or Challenges to Wilderness Suitability
Resurrection	Kenai Peninsula	224,630	Natural appearance and ecological conditions, cultural sites, adjacent to designated wilderness	Palmer Creek Road penetrates the area, recreation developments in and adjacent to area, motor vehicle and mechanized recreation patterns, mining activity, competitive events
Boston Bar	Kenai Peninsula	53,520	Natural appearance and ecological conditions, Recommended Wild and Scenic River (R)	Motor vehicle recreation patterns at Turnagain Pass, small area
Johnson Pass	Kenai Peninsula	152,450	Natural appearance and ecological conditions, historical sites	Mining activity, motor vehicle/mechanized recreation patterns
Kenai Lake	Kenai Peninsula	198,040	Natural appearance and ecological conditions, ecological diversity, large lakes, Research Natural Area, cultural sites, adjacent to designated wilderness	Snug Harbor Road, recreation developments and use patterns in and adjacent to area, human influence on fish and wildlife populations
Kenai Mountains	Kenai Peninsula	306,670	Natural appearance and ecological conditions, Ecological diversity, Recommended Wild and Scenic River (W), Adjacent to Wilderness Study Area	Winter motor vehicle recreation patterns, mining activity
Twentymile	Kenai Peninsula	198,780	Natural appearance and ecological conditions, Ecological diversity, Recommended Wild and Scenic River (S), Adjacent to Wilderness Study Area and state wilderness	Motor vehicle recreation patterns including power boats and helicopter-assisted activities, established competitive event
Nellie Juan	Prince William Sound	712,820	Natural appearance and ecological conditions, tidewater glaciers, part of Wilderness Study Area, Research Natural Area and other science, Recommended Wild and Scenic River (W), remoteness	Amount of private land, opportunities for solitude along coastline impacted by activities on adjacent intertidal zone and marine waters, hatchery and set net developments
PWS Islands	Prince William Sound	118,400	Natural appearance and ecological conditions, cultural sites, part of Wilderness Study Area	Communication site, opportunities for solitude impacted by size of islands and activities on adjacent interitidal zone and marine waters
College Fiord	Prince William Sound	1,114,290	Natural appearance and ecological conditions, scenery, glaciers, part of Wilderness Study Area, cultural and historical sites, size of area, scientific studies, remoteness	Opportunities for solitude impacted by size of islands and activities on adjacent intertidal zone and marine waters

Fidalgo-Gravina	Prince William Sound	256,890	Natural appearance and ecological conditions, Research Natural Area	Amount of state, private and EVOS lands (split estate), opportunities for solitude along coastline impacted by activities on adjacent marine waters
Montague Island	Prince William Sound	204,500	Natural appearance and ecological conditions, Research Natural Area, endemic species, remoteness	Amount of private land
Hinchinbrook-Hawkins Islands	Prince William Sound	136,950	Natural appearance and ecological conditions, cultural sites, low development	Amount and location of state and private land, motor vehicle use patterns
Copper River Wetlands	Copper River Delta	83,690	Natural appearance and ecological conditions, Research Natural Area and other science, Large in-tact wetland system, low development	ANILCA 501(b) management direction, size of area, opportunities for solitude impacted by activities on adjacent marine waters, motor vehicle recreation patterns on rivers, sloughs, and barrier islands
Sheridan Glacier	Copper River Delta	222,830	Natural appearance and ecological conditions, Glaciers, scenery, low development	Amount of state and private land, ANILCA 501(b) management direction, winter and summer motor vehicle recreation patterns
Bering Lake	Copper River Delta	957,460	Natural appearance and ecological conditions, Cultural sites, large in-tact wetland system, size of area, low development, remoteness	ANILCA 501(b) management direction, access mostly by power boat and float plane, road easement to private land (currently undeveloped)
Tasnuna River	Copper River Delta	342,920	Natural appearance and ecological conditions, Scenery, cultural sites, remoteness, low development	Amount and location of private land, ANILCA 501(b) management direction, access mostly by motor vehicles

Kenai Peninsula Geographic Area

Map 3. Inventory of lands that may be suitable as wilderness in the Kenai Peninsula geographic area.



Resurrection Inventoried Area

Gross acres: 228,030
National Forest System acres: 224,630

Apparent Naturalness

Appearance and Developments

Most of the area appears unmodified. Minor inclusions, such as the recreation cabins and trails, are evident when one is close to them. The timber salvage operations that have occurred within and adjacent to the southern end of the unit near Cooper Landing are evident from a distance.

The area exists in a predominantly natural condition. Overall, the area provides spectacular scenery. Prescribed burning for moose habitat occurred in the 1980s in the valley bottoms and lower slopes of Resurrection Creek and Juneau Creek. Also, several large, probably human caused fires swept through large parts of the area in about 1924. These events do not detract from the natural condition. Previous mining along Resurrection Creek near Hope altered the stream channel. Part of the creek has been restored, with plans for restoration of an additional two miles. The rest of the area is unmodified except for nine existing recreation cabins and trails. The majority of this inventoried area, 97 percent, is natural appearing where only ecological change has occurred.

Ecological Conditions/Composition of Plant and Animal Communities

Vegetation

The vegetation composition and structure of this area is primarily the result of natural processes. Non-native plants are common in areas of human disturbance, especially near roads and along trails. Areas of historic logging and hazardous fuels reduction are common near roads along the margins of the area. Areas of human-caused burning, both accidental and intentional, are also common in the forests.

Fish Resource

All five species of Pacific salmon (Chinook, coho, sockeye, pink, and chum) occur in this inventoried area as well as Dolly Varden char and rainbow trout. In addition, the only known population of burbot on the Chugach National Forest occurs in Juneau Lake. Although partially restored, a section of lower Resurrection Creek flows in an artificially straightened channel as a result of past gold mining. This is an unnatural condition and adversely impacts fish resources.

The annual number of spawning salmon is believed to fluctuate in natural patterns with a modest proportion of the run removed each year in fisheries. All watersheds contain Chinook salmon, a species which is currently in low abundance for unknown reasons. No hatchery fish are found in this area. Overall, the fish resources in this area are classified as being in a "slightly impacted" with regard to baseline natural conditions.

Wildlife Resource

All native wildlife associated with the habitats in this roadless area are expected to be present in sustainable numbers, including the dominant predators (AKNHP 2013). The tide-influenced Resurrection Creek provides wetland habitat for native birds and mammals that functions unimpeded by human development. There is both winter and summer range for the Kenai Mountain caribou herd in this area (ADF&G et al. 2003). The Kenai Mountain caribou herd was extirpated in the early 1900s due to overhunting and loss of habitat from human-caused fires and was re-established in a 1965 translocation (ADF&G et al. 2003). Moose, mountain goats, black and brown bears, wolves, and lynx, ptarmigan, and other wildlife are present.

Wildlife are expected to retain natural interactions with each other and their environment with minimal human interference, although garbage and human foods on the southern boundary and concentrations of fish waste near Russian River have the potential to change the natural behavior of bears, raptors, and corvids such that habituation and adverse population impacts could result. None of the native terrestrial wildlife in this area are proposed or listed in compliance with the ESA.

Opportunities for Solitude or Primitive and Unconfined Recreation

Opportunity for Solitude

There is a moderate opportunity for solitude within the area. The area is bounded on three sides by heavily used highways. Small communities of Hope/Sunrise and Cooper Landing are next to the north and south boundary of the unit respectively. The sounds of highway traffic and residential and commercial activities can be heard for several miles up the Resurrection Pass Trail near Cooper Landing. There are numerous access points and trailheads into the area. Access to the larger lakes in the area is also provided by floatplane. The present recreation use along the Resurrection Pass, which runs down the middle of the area, and Devil's Pass Trails are high, with relatively high use levels occurring year round. These trails are increasingly a destination for mountain bikers and recreation events. Other trails leading into parts of the unit are the Gull Rock Trail and the Hope Point Trail. A person traveling or camping along the trail system is likely to see other people, especially during high use periods. The opportunity for solitude substantially increases away from the trail system.

Opportunity for Primitive Recreation

Opportunities for primitive recreation are moderate as there is a high diversity of opportunities, but due to a relatively high amount of recreation-related development, there is only a moderate challenge to the recreation user.

ROS Class	Acres
Semi-primitive Non-motorized (SPNM)	18,700
Semi-primitive Non-motorized (SPNMA)	131,900
Semi-primitive Motorized (SPM)	58,400
Roaded Natural (RN)	13,400
Rural (R)	2,200

There are 65 miles of trail in the area and nine recreation cabins; eight of the cabins are accessed via the Resurrection Pass Trail. There is also a no amenity, non-fee campground accessible by the Palmer Creek Road in the northeast section of the area.

Motor Vehicle Recreation

From May 1 to November 30, the northern part of the area is open to OHVs on designated routes and helicopters. The rest of the area is closed to recreational motor vehicle use. Most of the area, including the Resurrection Pass Trail, is open to snowmobiles every other winter, snow cover permitting, from December 1 to April 30. Motor vehicle use has been regulated here since the mid-1970s.

Other Values

Ecological, geological, or scenic features

There are opportunities to see a spectacular waterfall at Juneau Falls. Trout, Juneau, and Swan lakes are easily accessible glacially carved alpine and sub-alpine lakes. Populations of the Alaska Region sensitive plant Eschscholtz's little nightmare (*Aphragmus eschscholtzianus*) occur in the area.

Opportunities to view and study mountain goats and Dall sheep in a small area are noteworthy. The Kenai Mountain caribou herd, which occurs across a broad area of the northern Kenai Peninsula, is one of the few caribou herds that occur on National Forest System lands in the United States.

Cultural and historic features of value

There are 30 known cultural sites within the unit. The Resurrection Creek and Palmer Creek drainages were the site of extensive prospecting and placer mining starting in 1888. The community of Hope was originally a mining community, and placer mining still occurs. Several old lode mines exist as well. This area is also part of the Kenai Mountains Turnagain Arm National Heritage Area.

Features of scientific or educational value

None identified.

Manageability

Shape and configuration of the area

The area is bounded by paved road and saltwater to the north, paved road on the east and south, and designated wilderness or proposed wilderness on the west. Feasibility of management in an inventoried condition is high. The Alaska Department of Transportation is currently analyzing route alternatives for the Sterling Highway in the Cooper Landing area. Three alternatives cross through the southern portion of this area. If one of these alternatives is implemented, the land between the new route and existing developments would be excluded from the area.

Management of adjacent lands

The unit is adjacent to the eastern edge of the Kenai Wilderness Area in the Kenai National Wildlife Refuge. The northeast edge, from the Chickaloon River drainage north, borders proposed wilderness currently being managed for its wilderness values. To the east and south, across the Hope and Sterling highways to the east and south respectively are National Forest System lands within the Boston Bar, Johnson Pass, and Kenai Lake Inventoried Areas. Management area prescriptions in these areas are similar.

Non-Federal lands

There are 3,400 acres of state and private lands within the inventoried area. All of these lands are adjacent to major roads along the boundaries of the area. Wilderness designation would have no effect on access to these adjacent, private lands.

Legally established rights or uses within the area

Land use authorizations

Special use authorizations in the area include outfitter/guide permits for hiking, camping, mountain biking, ski touring, horseback rides, and hunter transport. There is a Recreation Event Permit for a mountain bike race held annually in August. There is one communication site authorized that is accessible by helicopter on the Hope Mountain.

Minerals

There are dozens of placer mining claims in this area or near the boundaries. Substantially noticeable operations that were excluded from the inventory include Hope Mining Company operations on lower Resurrection Creek, one or more mechanical placer operations on Bear Creek, at least two operations on Quartz Creek, and a recently reclaimed location near the Coeur d'Alene campground on Palmer Creek. Other sites in the inventoried area include several creeks near the Seward Highway and several scattered lode claims. The Forest Service currently has 19 plans of operations for mining activities within or near

this area and additional mining activity is also likely occurring that does not require authorization. Several lode claims also exist on the headwaters of area drainages.

Federal or state laws affecting availability as wilderness

None.

Boston Bar Inventoried Area

Gross acres: 57,280
National Forest System acres: 53,520

Apparent Naturalness

Appearance and Developments

Most of the area appears unmodified. The area exists in a predominantly natural condition. Overall, the area provides spectacular scenery. The majority of this inventoried area, 96 percent, is natural appearing, where only ecological change has occurred. The area is essentially unmodified, except for minor changes from mining.

Ecological Conditions/Composition of Plant and Animal Communities

Vegetation

The vegetation composition and structure of this area is primarily the result of natural processes. Non-native plants are present in a few areas near roads and along trails.

Fish Resource

All five species of salmon are found in this study area as well as Dolly Varden char. Coho salmon are the primary species through much of the area, although none of the area watersheds are believed to contain large numbers of fish. Past gold mining has impacted the productivity of the lower reaches of these watersheds, possibly depressing fish numbers from historic levels. Fishery impacts are likely modest and no hatchery fish occur in the area. Compared to baseline natural conditions, the fish resources in this area warrant a "slightly impacted" classification.

Wildlife Resource

All native wildlife associated with the habitats in this roadless area are expected to be present in sustainable numbers, including the dominant predators (AKNHP 2013). None of the native terrestrial wildlife in this roadless area are proposed or listed in compliance with the ESA. Wildlife are expected to retain natural interactions with each other and their environment with minimal human interference. Extensive winter recreational use in this area, including backcountry skiing, snowmachining, and heli-skiing, has the potential to displace alpine wildlife, such as mountain goats and sheep.

Opportunities for Solitude or Primitive and Unconfined Recreation

Opportunity for Solitude

There is a moderate opportunity for solitude within the area. Low flying aircraft normally bypass the area flying either up Resurrection Pass or Turnagain Pass. Present recreation use levels are low except immediately adjacent to the area along Turnagain Pass and Sixmile Creek. Although there is considerable topographic screening and the distance from the perimeter to the core is between three and five miles, the area is relatively small with limited vegetative screening and some permanent off-site intrusions. Highway sounds are evident along the unit's edge but drop off rapidly where topographic barriers exist.

Opportunity for Primitive Recreation

The opportunity for primitive recreation is moderate as there are few developments but only a moderate amount of recreation diversity and few challenges to the recreation user. Much of the recreation use is by motor vehicles.

ROS Class	Acres
Semi-primitive Motorized (SPM)	58,400
Roaded Natural (RN)	13,400

There are no established summer trails or recreation cabins in the area. There is one winter snowmachine trail that is part of the Iditarod National Historic Trail Southern Trek, generally running parallel to the Seward Highway along most of the eastern boundary of the area.

Motor Vehicle Recreation

From May 1 to November 30, the area is open to helicopters and closed to OHVs. From December 1 to April 30, it is open to all motor vehicle uses, snow cover permitting. The west side of Turnagain Pass is the most popular snowmachining area within the national forest. Also, motor vehicle use in the Seattle Creek area has increased as snowmachine technology has improved over the past two decades.

Other Values

Ecological, geological, or scenic features

East Fork Creek and Sixmile Creek, along the southern and western border of the area are recommended for Wild and Scenic River classification under the Wild and Scenic Rivers Act. Six hundred acres are tentatively classified as scenic and 200 acres as wild. Sixmile Creek is a destination for whitewater rafting in southcentral Alaska.

Cultural and historic features of value

There are no inventoried cultural sites within the area. This area is part of the Kenai Mountains Turnagain Arm National Heritage Area.

Features of scientific or educational value

None identified.

Manageability

Shape and configuration of the area

The area is bounded by the Seward Highway, Hope Highway, and the Turnagain Arm. The feasibility of management in an inventoried condition is high unless the state decides to develop its land within the Seattle Creek drainage.

Management of adjacent lands

The Resurrection and Johnson Pass Inventoried Areas are within one-half mile of this area, across the Hope and Seward highways, respectively. The Kenai Wilderness Area in the Kenai National Wildlife Refuge is about 25 miles to the southwest.

Non-Federal lands

There are 3,760 acres of state and private lands within the inventoried area. All of these lands are adjacent to major roads, except state lands along Seattle Creek. Wilderness designation would have no effect on access to private lands along the road system, but could affect access to the state lands along Seattle Creek.

Legally established rights or uses within the area

Legally established rights or uses

Special use authorizations in the area include outfitter/guide permits for rafting, heli-skiing, avalanche education, ski touring, and snow machining. There are recreation event permits for dog trials held annually in July and August.

Minerals

Placer mining claims cover most of Gulch Creek in this area and the Forest Service currently has three plans of operations for mining activities within this area and additional mining activity is also likely occurring that does not require authorization. The operations in this area are not substantially noticeable.

Federal or state laws affecting availability as wilderness

None.

Johnson Pass Inventoried Area

Gross acres: 156,910
National Forest System acres: 152,450

Apparent Naturalness

Appearance and Developments

This area has a moderately high degree of natural integrity. Most long-term ecological processes are intact and operating. Some of the processes in the valley bottoms have been interrupted by mining and mineral development. These activities have also affected the apparent naturalness of the area and result in a moderately low level of apparent naturalness in some places. The majority of this inventoried area, 97 percent, is natural appearing where only ecological change has occurred.

Ecological Conditions/Composition of Plant and Animal Communities

Vegetation

The vegetation composition and structure of this area is primarily the result of natural processes. Non-native plants are common in areas of human disturbance, especially near roads and along trails. Areas of historic logging and hazardous fuels reduction are common near roads along the margins of the area. Areas of human-caused burning, both accidental and intentional, are also common in the forests.

Fish Resource

Chinook, Coho, and sockeye salmon occur in this area but chum and pink salmon do not. Dolly Varden char are present. It is believed this was probably the natural condition. There has likely been some impact on Chinook from the effects of gold mining that took place in Canyon Creek during the past century. Fishery impacts are likely minor and no hatchery salmon are present. The fish resources in this area are rated as being in a "nearly natural" condition.

Wildlife Resource

All native wildlife associated with the habitats in this roadless area are expected to be present in sustainable numbers, including the dominant predators (AKNHP 2013). None of the native terrestrial wildlife in this roadless area are proposed or listed in compliance with the ESA. Wildlife are expected to retain natural interactions with each other and their environment with minimal human interference. Summit Lakes and other riparian habitat support beavers, loons, moose, and trumpeter swans. Mountain goats and Dall sheep can be observed in this area. Heli-skiing and other types of winter recreation has the potential to alter the natural behavior of mountain goats and Dall sheep in this inventoried area and could influence natural behavior of wolverines and denning bears, depending on timing, extent, and duration. The large amount of dead wood from past spruce beetle infestations support cavity-nesters and insectivorous birds, but these populations may change as the dead wood decays. Moose and black bears are common, and brown bears can be observed occasionally.

Opportunities for Solitude or Primitive and Unconfined Recreation

Opportunity for Solitude

The opportunity for solitude in this area is high, especially moving away from the Seward Highway. Exceptions to this are Johnson Pass Trail throughout the year and Turnagain Pass in the winter, which are both popular recreation destinations. The area is relatively large with a high level of topographic screening. In winter, the Turnagain Pass area is one of the most popular backcountry skiing destinations in southcentral Alaska. Highway and railroad sounds are evident along the unit's edge but drop off

rapidly where topographic barriers exist. The distance from the perimeter to the core is between 7 and 10 miles.

Opportunity for Primitive Recreation

The opportunity for primitive recreation is moderate as a result of a moderate diversity of recreation opportunities and few challenges to the recreation user. There are approximately 60 miles of trails, but no developed public use cabins in the area. Several dispersed campsites are located along Johnson Pass Trail.

ROS Class	Acres
Semi-primitive Non-motorized (SPNM)	36,000
Semi-primitive Non-motorized (SPNMA)	93,300
Semi-primitive Motorized (SPM)	13,900
Roaded Natural (RN)	8,500
Rural (R)	900

Motor Vehicle Recreation

From May 1 to November 30, the area is closed to motor vehicle uses. From December 1 to April 30, approximately half of the area is open to snowmachines. Johnson Pass Trail is a popular snowmachine route, and the Placer River is commonly used by jet boats and airboats.

Other Values

Ecological, geological, or scenic features

Small hanging glaciers can be seen high on rugged mountainside slopes. Intriguing glacial topography is evident everywhere.

Cultural and historic features of value

The Johnson Pass Trail is part of the Iditarod National Historic Trail. There are nine known cultural sites within this area. This area is also part of the Kenai Mountains Turnagain Arm National Heritage Area.

Features of scientific or educational value

None identified.

Manageability

Shape and configuration of the area

The area is bounded by the Seward Highway and the Alaska Railroad. The feasibility of management in an inventoried condition is high.

Management of adjacent lands

The Resurrection, Boston Bar, Kenai Lake, and Kenai Mountains Inventoried Areas surround the area and are all within one-half mile of this area. The Kenai Wilderness Area in the Kenai National Wildlife Refuge is about 20 miles to the west.

Non-Federal lands

There are 4,520 acres of state land and 38 acres of private land within the inventoried area. All of these lands are adjacent to major roads or the railroad. Wilderness designation would have no effect on access to these adjacent lands.

Legally established rights or uses

Land use authorizations

Special use authorizations in the area include outfitter/guide permits for hiking, camping, mountain biking, fly in fishing, guided big game hunting, horseback rides, ski touring, snow machining, and heli-skiing.

Minerals

There are dozens of placer mining claims in this area including Canyon, Silvertip, Lynx, Lyon, Tincan, Bertha, Mills, and Bench creeks. The Forest Service currently has 15 plans of operations for mining activities within this area and additional mining activity is also likely occurring that does not require authorization. Evidence of past operations can be found in small areas on Lynx and Mills creeks.

Federal or state laws affecting availability as wilderness

None.

Kenai Lake Inventoried Area
N

Gross acres: 220,700
National Forest System acres: 198,040

Apparent Naturalness

Appearance and Developments

The area has a high degree of natural integrity. Most long-term ecological processes are intact and operating. Some evidence of human activity exists (e.g., cabins, trails, and mining operations), but these activities have had little or no effect on the natural integrity of the area. Prescribed burning has had little effect on the natural integrity. Wildfires have swept through portions of the area, especially the area around Russian Lake. The most recent large fire was in 1989. There are 1.4 miles of private road within the the area. Most of this inventoried area, 97 percent, is natural appearing, where only ecological change has occurred. A new road accessing the Cooper Lake dam and Stetson Creek diversion from the Sterling Highway was constructed. This development, along with the dam and diversion, is excluded from the inventoried area, and affects the naturalness of the Cooper Creek and lower Stetson Creek.

Ecological Conditions/Composition of Plant and Animal Communities

Vegetation

The vegetation composition and structure of this area is primarily the result of natural processes. Non-native plants are common in areas of human disturbance, especially near roads and along trails. Areas of historic logging and hazardous fuels reduction are common near roads along the margins of the area. Areas of human-caused burning, both accidental and intentional, are also common in the forests.

Fish Resource

This area contains a large diversity of habitats and has a greater number salmonid species than any other inventoried area. Present are all five salmon species, Dolly Varden char, and rainbow trout. In addition, the only known Chugach National Forest population of lake char (lake trout) and arctic char occur within this area. Many of the species in this area rely on Kenai Lake for a portion of their life history. The Quartz Creek drainage is an important spawning and rearing area for the early run of Chinook salmon that return to the Kenai watershed.

Past gold mining operations have adversely impacted the Cooper Creek watershed and, to a lesser extent, the Quartz Creek watershed. A hydropower development in the upper Cooper Creek watershed diverts a large portion of the natural flow through a power station and into a different drainage. As a result, flows in Cooper Creek are substantially less than they were historically. These changes have had an adverse impact on species diversity and fish abundance. Human foot traffic associated with an extremely popular fishery has damaged the riparian vegetation and stream complexity in the lower reaches of the Russian River. Downstream commercial, personal use, and sport fisheries have reduced the number of sockeye salmon in the Kenai watershed portion of this inventoried area compared to historical times. As a result, the annual supplement of marine derived nutrients to the Kenai watershed ecosystem is less than under natural, pre-fishery conditions (approximately 100 years ago).

Although no hatchery salmon occur in the Kenai watershed portion of this study area, hatchery reared Chinook, coho, and sockeye salmon occur in the Salmon Creek watershed and likely stray into the Resurrection River as well. The degree of mixing between hatchery and wild fish on the spawning

grounds is not known nor is the impact of this mixing on wild populations; however, based on studies elsewhere, the impacts are likely negative. Hatchery produced rainbow trout are released into Carter Lake, located west of Upper Trail Lake, and Rainbow Lake, located east of Cooper Lake, to enhance recreational fishing opportunities. Overall, the fish resources in this area could be classified as having been "moderately impacted" by human influences.

Wildlife Resource

All native wildlife associated with the habitats in this area are expected to be present in sustainable numbers, including the dominant predators (AKNHP 2013). None of the native terrestrial wildlife are proposed or listed in compliance with the ESA. Some exceptional wildlife habitat for moose, black bear, Dall sheep, mountain goats, trumpeter swans, mergansers, arctic terns, and beaver occurs in the Kenai Lake area. Wildlife are expected to retain natural interactions with each other and their environment with minimal human interference, with the exception of the Russian River, an area that contributes to the habituation of bears due to large numbers of anglers, fish waste, and human food accumulations. A recent monitoring report found that up to 30 percent of visitors did not comply with food storage and fish waste guidelines (Skibo, personal communication January 21, 2015). The adjacent Russian River management area gets up to 110,000 visitors a year or more, which impacts natural wildlife movements and behavior (USDA et al. 2013).

Opportunities for Solitude or Primitive and Unconfined Recreation

Opportunity for Solitude

The opportunity for solitude in the northern portion of the unit is generally moderate. The sounds of highway traffic and residential and commercial activities can be heard until topographic breaks drown out the sound. The rolling alpine along the ridges and high passes provide long viewing distances, making people visible from a distance. At lower elevations, especially away from established trails, a person camped or traveling is unlikely to see others.

The Russian River, near the northwest boundary of the area, is one of the most popular fishing destinations in the state. The first three miles of the Russian Lakes trail, which accesses the Russian River Falls, is one of the most highly used trails within the national forest in the summer. The opportunity for solitude south of Kenai Lake is high. The area is relatively large with a high level of topographic screening. One exception is the Lost Lake area and trail near Seward, which is a highly-used trail in both summer and winter reaching an alpine area with lower levels of topographic screening. The distance from the perimeter to the core is between 4 and 12 miles.

Opportunity for Primitive Recreation

There are many opportunities for primitive recreation in the area. There is a high diversity of recreation opportunities and moderate challenge to recreation users, with more infrastructure providing support than some other areas within the national forest.

ROS Class	Acres
Primitive (P)	5,900
Semi-primitive Non-motorized (SPNM)	50,800
Semi-primitive Non-motorized (SPNMA)	104,800
Semi-primitive Motorized (SPM)	26,100
Roaded Natural (RN)	9,300
Rural (R)	1,100

There are 102 miles of trail in the area and five recreation cabins. Three small campsites are located along the shores of Kenai Lake.

Motor Vehicle Recreation

From May 1 to November 30, the area is closed to motor vehicle use except in the area around Cooper Lake, which is open to motor vehicle use on designated routes only. Most of the area is open to over the snow vehicle use from December 1 to April 30, with the exception of the lands west of Cooper Lake to the national forest boundary. Powerboats are allowed on Kenai Lake, though use is relatively low.

Other Values

Ecological, geological, or scenic features

Several large spectacular lakes, including Crescent and Kenai lakes, are found within the area. The Russian River is recommended as scenic (200 acres) and wild (2,800 acres) under the Wild and Scenic Rivers Act. The area also features high ecological diversity including two provinces, two sections, and three subsections. Populations of the Alaska Region sensitive plant pale poppy (*Papaver alboroseum*) occur in the area.

As noted, this watershed contains the largest salmonid diversity of any inventoried area within the Chugach National Forest, including the only natural populations of lake char and arctic char. In addition, the Kenai Lake watershed provides a clean headwater source of water for Kenai River, a system that produces the largest freshwater fisheries in Alaska for sockeye, Coho, and Chinook salmon and rainbow trout.

Cultural and historic features of value

There are 21 known cultural sites within the unit. It is also part of the Kenai Mountains Turnagain Arm National Heritage Area. The land along the Russian River includes much of the Sqilantnu Archeological District, a feature of high cultural, prehistoric, and historical value. Connecting trails of the Iditarod National Historic Trail generally parallel the Seward Highway in the southeast corner of the area.

Features of scientific or educational value

The area contains the Kenai Lake-Black Mountain Research Natural Area, featuring a representative range of Sitka spruce-white spruce-Lutz spruce forest and a wide diversity of vegetation types (USDA 2007b).

Genetic analysis of Chinook salmon populations in this area demonstrates there is a substantial degree of genetic variation among populations in this area. Similar analysis of the other salmon species would likely get the same result. The diversity of area habitats is likely one of the reasons for this pattern of

genetic differentiation. Because of this high degree of diversity, this area provides an excellent laboratory to study how genetic structuring among populations develops and is related to habitat types.

Manageability

Shape and configuration of the area

The area is bounded by Sterling and Seward Highways on the north and east, respectively. The Kenai Wilderness Area in the Kenai National Wildlife Refuge forms the southern and western boundary. The Snug Harbor road extends into the center of the area, terminating at Cooper Lake. Feasibility of management in an inventoried condition is high.

Management of adjacent lands

The area lies immediately to the east of wilderness areas administered by the Kenai National Wildlife Refuge and the Kenai Fjords National Park. To the north and west of the unit, within one-half mile, are the Resurrection, Johnson Pass, and Kenai Mountains Inventoried Areas.

Non-Federal lands

There are 22,660 acres of state land and private land within the inventoried area. All of these lands are adjacent to major roads. Wilderness designation would have no effect on access to these adjacent private lands.

Legally established rights or uses

Land use authorizations

Special use authorizations in the area include outfitter/guide permits for hiking, camping, mountain biking, fly-in, boat and hike-in fishing, big game hunting, horseback rides, ski touring, and heli-skiing. The Lost Lake Run is held annually under a recreation event permit. There are two other recreation events, a kayak/run race on Kenai Lake and Lost Lake Trail, and another run involving Primrose and Grayling Trails. There are helicopter access communication site leases authorized on Cooper Mountain, Cecil Rhode Mountain, and Tern Peak.

Minerals

Much of Stetson and Cooper creeks are overlain with placer mining claims. Additional placer mining claims exist on Marten and Crescent creeks and several lode claims are located on Primrose Creek. The Forest Service currently has six plans of operations for mining activities within this area and additional mining activity is also likely occurring that does not require authorization. Evidence of past operations are present on Crescent Creek. The lode deposit along Primrose Creek has the potential to be developed.

Federal or state laws affecting availability as wilderness

None.

Kenai Mountains Inventoried Area

Gross acres: 319,600
National Forest System acres: 306,670

Apparent Naturalness

Appearance and Developments

The majority of this inventoried area is natural appearing, where only ecological change has occurred. While some evidence of human activity exists (e.g., mining operations, trails, and cabins), these activities have had little or no effect on the natural appearance of the area away from developments near the boundaries. Previous mineral material operations and current recreation development in the Spencer Glacier area form a small window of approximately 350 acres that are excluded from the area as well. The majority of this area, more than 97 percent, is natural appearing, where only ecological change has occurred. The areas with lower scenic integrity occur near the boundaries, including Portage Valley and along the Alaska Railroad.

Ecological Conditions/Composition of Plant and Animal Communities

Vegetation

The vegetation composition and structure of this area is primarily the result of natural processes. Non-native plants are present in a few areas near roads and along trails.

Fish Resource

With the exception of several Placer River tributaries, the highly glacial and turbid water conditions common to this area are generally less favorable to fish production compared to other areas of the Chugach National Forest. However, four of the five salmon species occur in this area (chum salmon are missing) as do Dolly Varden char. The existing railroad grade has resulted in an unnatural restriction in water flow across the eastern Placer River valley floor. The highway from Portage to Whittier creates a hydrologic barrier that has caused what is known as Explorer Creek to become part of the Placer River watershed, where formerly it had been part of the Portage Valley watershed. Sockeye that occur in the Snow River system have been impacted by intensive freshwater fisheries that take place downstream of Kenai Lake. Hatchery salmon are present in the Bear Lake system, although all but a small portion of this watershed is outside of the inventoried area. Hatchery rainbow trout are also released into Vagt Lake, a small water body less than a mile east of Lower Trail Lake. Overall, the fish resources in this area have been "slightly impacted" by human activities.

Wildlife Resource

All native wildlife associated with the habitats in this roadless area are expected to be present in sustainable numbers, including the dominant predators (AKNHP 2013). Wildlife are expected to retain natural interactions with each other and their environment with minimal human interference. None of the native terrestrial wildlife in this roadless area are proposed or listed in compliance with the ESA. The combination of natural wetlands and upland mixed forest support spruce grouse, great horned and boreal owls, trumpeter swans, several species of ducks, Arctic terns, and several species of woodpeckers, in addition to moose, bear, wolves, Canada lynx, mountain goats, and Dall sheep.

Opportunities for Solitude or Primitive and Unconfined Recreation

Opportunity for Solitude

The opportunity for solitude in the area is high away from the boundaries of the Spencer and Portage Valley Developed Recreation Complexes. The sounds of highway traffic and residential and commercial activities can be heard until topographic breaks drown out the sound. The area is very large with a high level of topographic screening. The distance from the perimeter to the core is between 6 and 18 miles. Recreation use is heaviest adjacent to the developed recreation sites outside the unit at Portage and Ptarmigan Creek. Recreation use is light throughout the rest of the area, including limited guided recreation, particularly in the southeastern section of the area, which includes Upper and Lower Paradise lakes.

Opportunity for Primitive Recreation

Opportunities for primitive recreation are high with a diversity of recreation opportunities and moderate to high levels of challenge to the recreation user, and much of the area is remote from developments.

ROS Class	Acres
Semi-primitive Non-motorized (SPNM)	29,200
Semi-primitive Non-motorized (SPNMA)	141,200
Semi-primitive Motorized (SPM)	132,500
Roaded Natural (RN)	3,300
Rural (R)	500

There are approximately 19 miles of maintained trail and 30 miles of unmaintained trail in the area. The unmaintained trail connects Ptarmigan Lake to Paradise Lake. There are three recreation cabins: one at Upper Paradise Lake, one at Lower Paradise Lake, and a new cabin that was built near Spencer Glacier in 2014.

Motor Vehicle Recreation

From May 1 to November 30, there is a small area around Grant Lake open to OHV use only on designated routes, with the rest of the area closed to OHVs. About 30 percent of the area is open to helicopters and helicopter skiing is permitted in the area. Most of the area is open to winter motor vehicle recreation from December 1 to April 30, snow conditions permitting, except the northern section of Placer River valley, which is open to use until March 31. A corridor through a closed area along the South Fork of the Snow River is also open to winter motor vehicle use. Snowmachining is popular in these open areas.

Other Values

Ecological, geological, or scenic features

There are several spectacular lakes including Ptarmigan, Lower and Upper Paradise, and Grant lakes. Snow River is an eligible as a wild river under the Wild and Scenic Rivers Act. The glacial outburst flooding associated with the Snow Glacier is a long-term and significant event of geologic and educational value. Enough water can be released to raise the level of Kenai Lake.

The area features high ecological diversity, including three provinces, three sections, and five subsections. Populations of the Alaska Region sensitive plant pale poppy (*Papaver alboroseum*) occur in the area. A

population of the Alaska Region sensitive plant spotted lady's slipper (*Cypripedium guttatum*) also occurred in the area but was lost to gravel pit development.

Cultural and historic features of value

There are 26 known cultural sites within the area. This area is part of the Kenai Mountains Turnagain Arm National Heritage Area. Segments of the Iditarod National Historic Trail generally run parallel to the Seward Highway between milepost 18 of the highway and Moose Pass.

Features of scientific or educational value

The area contains a small portion of the Wolverine Glacier Research Natural Area, at Wolverine Glacier near Paradise Lake.

Manageability

Shape and configuration of the area

The area is bounded by paved road or railroad on the north and west. The southern boundary, which abuts state land, is not well defined. The eastern boundary is, for the most part, the topographic divide between the Kenai Peninsula and Prince William Sound. Feasibility of managing in an inventoried condition is high, particularly in the eastern section of the area.

Management of adjacent lands

This area is immediately to the west of the Nellie Juan-College Fiord Wilderness Study Area identified by Congress in ANILCA. The Kenai Lake and Johnson Pass inventoried areas are within one-half mile to the west of this area. The Twentymile inventoried area is to the north. The Kenai Wilderness Area in the Kenai National Wildlife Refuge is about 20 miles to the west. The Kenai Fjords National Park is about 15 miles to the west.

Non-Federal lands

There are 12,930 acres of state and private land within the inventoried area. Most of these lands are adjacent to major roads. Wilderness designation would have no effect on access to these adjacent private lands. State lands border the inventoried area to the south. A portion of Grant Lake is under a hydropower withdrawal. There are three parcels of private lands on the southeast border of the area.

Legally established rights or uses

Land use authorizations

Special use authorizations in the area include outfitter/guide permits for hiking, camping, mountain biking, hike-in and boat fishing, rafting, big game hunting, ice climbing, ski touring, and heli-skiing. Homer Electric submitted a Draft License Application that was accepted by the Federal Energy Regulatory Commission in March 2015 for a proposed hydropower development at Grant Lake.

Minerals

There are dozens of lode mining claims in this area, including at Falls Creek, Crown Point, Grant Lake, and other locations off the Seward Highway. Victor Creek also has some placer mining activities. The Forest Service currently has four plans of operations for mining activities within this area and additional mining activity is also likely occurring that does not require authorization. Some evidence of past operations along Falls Creek, Crown Point, and Grant Lake are noticeable.

Federal or state laws affecting availability as wilderness

None.

Twentymile Inventoried Area

Gross acres: 213,840
National Forest System acres: 198,390

Apparent Naturalness

Appearance and Developments

This area has a very high degree of natural integrity. Most long-term ecological processes are intact and operating. Some evidence of human activity exists (e.g., cabins and old logging activity) but these activities have little effect on the natural integrity of the area. A few isolated private cabins are located in the Twentymile River valley. Apparent naturalness is highest in the remote northern section of this area.

Ecological Conditions/Composition of Plant and Animal Communities

Vegetation

The vegetation composition and structure of this area is primarily the result of natural processes. Non-native plants are present in a few areas near roads and along trails.

Fish Resource

All five species of salmon occur in this area, although pink salmon are quite rare. Dolly Varden char are common. In addition, the lower Twentymile River is one of the few places within the Chugach National Forest where large numbers of eulachon (also known as hooligan) are known to occur. The Twentymile River system is the largest watershed in this study area and contains aquatic habitat that is largely in its native state. Although Portage Valley has been heavily impacted by gravel mining and road and rail infrastructure, most of this has taken place outside the of the area boundaries. Fishery impacts on salmon returning to this area probably are low and hatchery reared salmon are not present. Within the inventoried area boundaries, human influence is minimal and the fish ecosystem is probably in a "nearly natural" condition.

Wildlife Resource

All native wildlife associated with the habitats in this inventoried area are expected to be present in sustainable numbers, including the dominant predators (AKNHP 2013) The wildlife are expected to retain natural interactions with each other and their environment with minimal human interference although heli-skiing and other winter recreation has the potential to influence the natural behavior of mountain goats and Dall sheep. None of the native terrestrial wildlife in this area are proposed or listed in compliance with the ESA, although the threatened beluga whale can be observed in the salt water adjacent to this inventoried area. Belugas occasionally venture into Twentymile River to feed on eulachon and small salmon. The Seward Highway and Alaska Railroad occur outside the Twentymile inventoried area but affect the inventoried area by curtailing natural movement of water and wildlife between the upslope areas and the ocean.

Opportunities for Solitude or Primitive and Unconfined Recreation

Opportunity for Solitude

The opportunity for solitude in the area is high. Most activity occurs along the Twentymile River or in the Crow Pass area along the Crow Pass Trail. Backcountry skiing, mountaineering, and hiking takes place in the glaciers and mountains near Crow Pass. The area provides a high level of topographic screening. The distance from the perimeter to the core is 7 to 10 miles. Motor boats are common in the late summer and

fall during the Coho salmon run, and helicopter and small plane overflights are common during the summer season.

Opportunity for Primitive Recreation

The opportunity for primitive recreation is very high as a result of highly diverse recreation opportunities, a high level of challenge for the recreation user, and few or no developments in the area. The area provides primarily semi-primitive opportunities. There are approximately 11 miles of developed trails in the area.

ROS Class	Acres
Semi-primitive Non-motorized (SPNM)	75,500
Semi-primitive Non-motorized (SPNMA)	37,500
Semi-primitive Motorized (SPM)	84,700
Roaded Natural (RN)	800
Rural (R)	200

Motor Vehicle Recreation

From May 1 to November 30, almost all of the area is closed to OHVs, while approximately half of the area is open to helicopters. Most of the area is open to winter motor vehicle recreation from December 1 to April 30, except for the areas along the Seward Highway. Access to the open area is by a corridor along Twentymile River. Jet boats, air boats, and hover craft use the Twentymile River.

Other Values

Ecological, geological, or scenic features

The area features high ecological diversity including three provinces, three sections, and five subsections. Populations of the Alaska Region sensitive plant pale poppy (*Papaver alboroseum*) occur in the area.

The presence of eulachon in the Twentymile River is unique. As noted, this species exists in high numbers at this location alone on the Chugach National Forest, with the exception of a presence in Copper River Delta. Cook Inlet beluga whales, utilize eulachon from the Twentymile population as an important food source (Hobbs et al. 2006).

Dead trees inland from the Seward Highway in Twentymile River valley are evidence of the 9.2 magnitude 1964 earthquake when salt water flooded the forested wetlands, killing the trees and changing the habitat. The marsh serves as a natural classroom of the power of natural disturbance events. The Twentymile River is also recommended as a scenic river under the Wild and Scenic Rivers Act.

Cultural and historic features of value

There are four known cultural sites within the area. This area is part of the Kenai Mountains Turnagain Arm National Heritage Area, and segments of connecting trails for the Iditarod National Historic Trail cross through these lands.

Features of scientific or educational value

The diversity of aquatic and terrestrial features in the Three Rivers area of Twentymile River, Portage Creek, and Placer River valleys at the head of Turnagain Arm, combined with the proximity and access of

this inventoried area to the University of Alaska, provides an opportunity for place-based research, education, and outreach opportunities (Welker et al. 2012).

The northern glade of ice worms, adapted to life on ice, have been studied on Byron Glacier in this inventoried area, although they also occur sporadically in some, but not all, of the Chugach National Forest inventoried areas.

Manageability

Shape and configuration of the area

The state land boundaries adjacent to the area are not well defined on the ground. State land below the mean high tide line is also poorly defined. The southern border is the Alaska Railroad, which runs parallel to the Seward Highway. The western boundary is the watershed dividing line with the College Fiord Inventoried Area. The feasibility for managing this area as inventoried is high.

Management of adjacent lands

This unit is immediately to the west of the College Fiord Inventoried Area and Nellie Juan-College Fiord Wilderness Study Area. Boston Bar and Kenai Mountains inventoried areas are within one-half mile south of the unit. The Kenai Wilderness Area in the Kenai National Wildlife Refuge is about 50 miles to the west. Chugach State Park is north of the area, including an adjacent section that is managed as state wilderness area.

Non-Federal lands

There are 15,450 acres of state and private land within the inventoried area. Most of these lands are adjacent to major roads or salt water. Wilderness designation would have no effect on access to these lands. Some state lands border the inventoried area to the south. Wilderness designation would limit access to lands in Prince William Sound to salt water.

Legally established rights or uses

Land use authorizations

Special use authorizations in the area include outfitter/guide permits for hiking, camping, fishing, jet boat tours, pack rafting, rafting, ski touring, snow machining, helicopter supported dog sled tours on Punchbowl Glacier, and heli-skiing. There is an annual race on Crow Pass Trail in June under a recreation event permit. An education center is authorized for Nordic ski training on Eagle Glacier to the Alaska Pacific University. There are two isolated cabins under special use permits within the Twentymile drainage. There is one communication site accessible by helicopter on the mountain adjacent to Portage Valley.

Minerals

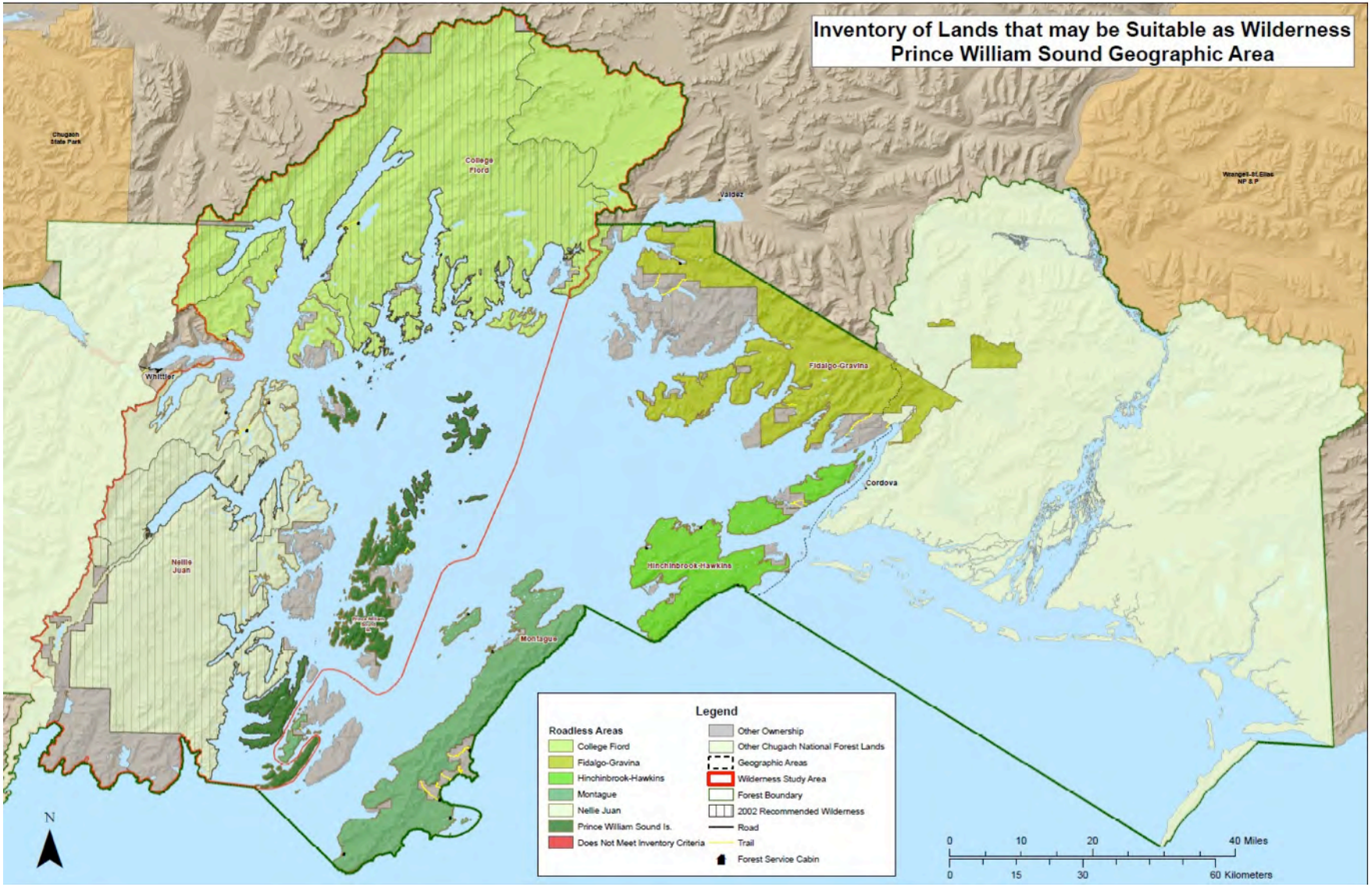
There are placer mining claims in this area on Crow and Peterson creeks. The Forest Service currently has one plan of operations for mining activities within this area and additional mining activity is also likely occurring that does not require authorization.

Federal or state laws affecting availability as wilderness

None.

Prince William Sound Geographic Area

Map 4. Inventory of lands that may be suitable as wilderness in the Prince William Sound geographic area.



Nellie Juan Inventoried Area
Gross acres: 924,870
National Forest System acres: 712,820

Apparent Naturalness

Appearance and Developments

The majority of this inventoried area is natural appearing, where only ecological change has occurred; along with the Prince William Sound Islands and College Fiord Inventoried Areas, this area has been managed to maintain its wilderness character as part of the Nellie Juan-College Fiord Wilderness Study Area since being designated in 1980. There are 0.7 miles of private road within the unit. While the area appears primarily affected by the forces of nature, with minimal imprints from modern human activity, certain exceptions exist. The Main Bay Fish Hatchery in Main Bay is the only area of modern development in this inventoried area. It is limited to approximately ten acres and includes a fish hatchery, diesel generator system, short road, and several buildings. The hatchery and related developments are managed according to ANILCA 1315(b), which states the site must be "constructed, managed, and operated in a manner that minimizes adverse impacts on the wilderness character of the area." Eighteen set-net commercial fishing camps are located in and near Main Bay. They generally consist of one or two plywood platforms and a privy. A few include cabins. They are occupied for six to eight weeks during the peak of commercial fishing season in June and July. Evidence of past mining, fox farming, homesteading, and other activities is present in various locations throughout the area. Among the largest is the former Nellie Juan Cannery in McClure Bay, which was destroyed in the 1964 earthquake.

Recreational impacts are present along popular shorelines in Blackstone Bay, Culross Passage, Derickson Bay, and other areas, but are generally limited to small areas of disturbed vegetation. Most of the area shows little or no development or impacts related to recreation. Popular anchorages and beaches used by boaters and kayakers provide entry points to the uplands and may show signs of visitor use.

Ecological Conditions/Composition of Plant and Animal Communities

Vegetation

The vegetation composition and structure of this area is primarily the result of natural processes. Non-native plants are rare in the area.

Fish Resource

Salmon are abundant in this area with 127 total populations identified and all five species of Pacific salmon represented. Dolly VaDo tell.rden char and cutthroat trout also occur in this area, although Dolly Varden are more common. There has been very little disturbance to the natural condition of the freshwater habitat. However, commercial fisheries catch a substantial portion of the wild pink and chum salmon each year with 1990 to 2011 average interception rates of 40 percent and 27 percent, respectively. Therefore, the number of fish reaching the spawning grounds has been reduced from the natural historical condition as has been the rate of infusion of marine derived nutrients to the watershed ecosystems from decomposing salmon carcasses.

Four large fish hatcheries are located in Prince William Sound and although most of the returning fish they produce are either caught or return to the facilities, a significant number stray into natural production areas and mix with wild salmon. Brenner et al. (2012) found that streams in southwestern Prince William Sound were particularly vulnerable to large numbers of stray hatchery fish. It is likely that many of the pink salmon populations in this area are mixtures of hatchery strays and wild fish, with hatchery fish

comprising 10 percent to 25 percent of the spawning population. Such levels likely risk the natural genetic character of wild pink salmon and reduce their productivity. Overall, human influence on the fish resource that relies on habitats within the borders of this area has probably had a "slight impact" on its natural character.

Wildlife Resource

All native wildlife associated with the habitats in this roadless area are expected to be present in sustainable numbers, including the resident and migratory shore and seabirds (AKNHP 2013) common along Prince William Sound. The Nellie Juan Inventoried Area has many islands in addition to mixed conifer forests and wetlands, and therefore a wider variety of shorebirds and marine mammal haul outs occur than in the inland roadless areas. Federally-listed Steller sea lions (FE) haul out in several off-shore rocks in this area. Specific haul outs are buffered from disturbance as federally designated critical habitat for Steller sea lions. The Nellie Juan Inventoried Area has many beaches used by nesting black oystercatchers and other shoreline birds. The larger islands and inland areas support black and brown bear populations. Black bear harvest has increased in this area since the Anton Anderson Memorial Tunnel was built. The tunnel provides easier access for hunters and fishermen and recreational boaters, and may have contributed to higher black bear harvest in GMU 6, an area that overlaps much of this area. Decreased harvest and reduced skull size in recent years suggest a concern for the black bears population in GMU 6.

Some of the islands are free of large mammals, such as wolves, bears and other fur-bearers, making them excellent bird sanctuaries. Fur bearers and prey were introduced to many of the islands from the late 1800s through the early 1900s to provide a fur source. Most of these animals over-utilized their habitat and starved or died of disease. A few still remain on the islands and may affect breeding bird habitat. Human activities have the potential of impacting nesting sea and shore birds during their crucial breeding period, as well as resting seals and sea lions. The 1989 EVOS affected some of the islands in the Nellie Juan Inventoried Area. European black slugs (*Arion* spp) have been noted in the inventoried areas near beaches and recreational areas and appear to be spreading.

Except where noted, wildlife are expected to retain natural interactions with each other and their environment with minimal human interference.

Opportunities for Solitude or Primitive and Unconfined Recreation

Opportunity for Solitude

The opportunity for solitude in the area is high, with many outstanding opportunities in upland areas. Sights and sounds of vessels are common along shorelines during summer. The area near the shore is popular with boat or kayak based recreation users. The distance from the perimeter to the core is between 18 and 30 miles. The area includes some of the most remote lands within the Chugach National Forest. Access is only possible by aircraft, snow machine, or boat. Virtually all aircraft access is by floatplane to saltwater or large lakes. Limited landings also occur on the glaciers by aircraft fitted with skis. There are no established aircraft landing sites in the area.

Forest Service studies and wilderness character monitoring have provided information on areas where certain activities diminish opportunities for solitude in the inventoried area, primarily during the peak summer season (Poe et al. 2010). The Main Bay Fish Hatchery and set net camps in Main Bay provide the most persistent impacts on solitude. Along popular shorelines throughout the inventoried area, the presence of boats on adjacent marine waters represents another common impact to solitude. In some areas, especially where commercial fishing occurs, visitors may commonly hear or see marine vessels during the peak summer months while along shore. Tour vessels and private recreation boats, motorized

and non-motorized, are common on waterways closest to Whittier and in popular areas such as Blackstone Bay and Culross Passage. Commercial airline traffic associated with the Ted Stevens International Airport in Anchorage also affects solitude. Jets traveling to and from the airport often fly between 12,000 and 18,000 feet over western Prince William Sound. The majority of the impacts originate outside National Forest System lands and during the peak summer months. Outside of the peak summer months, commercial fishing and vessel traffic is greatly reduced. Forest Service monitoring shows visitors may spend several days in the area between October and May without experiencing any sights or sounds of marine vessels.

Forest Service monitoring shows opportunities for solitude are particularly outstanding in Port Bainbridge, Icy Bay, Whale Bay, Kings Bay, Kings River, around Nellie Juan Lake, and in various other locations. These are some of the best near-shore opportunities for solitude in summer.

Opportunity for Primitive Recreation

Forest Service wilderness character monitoring shows the area offers outstanding opportunities for primitive and unconfined recreation. This inventoried area contains some of the best opportunities for primitive recreation within the Chugach National Forest. Kayaking, camping, hunting, fishing, skiing, and other non-motorized activities that rely on physical skills and self-reliance are popular in the area. Opportunities for rescue, shelter, and motor vehicle assistance are generally rare, especially away from popular shorelines and outside of the peak summer season. Many of the same factors that affect solitude also affect primitive recreation. They include development, motor vehicle transport, and regular human presence, which detract from self-reliance, challenge, solitude, and other qualities associated with primitive recreation.

ROS Class	Acres
Primitive (P)	459,500
Semi-primitive Non-motorized (SPNM)	168,000
Semi-primitive Non-motorized (SPNMA)	85,200
Semi-primitive Motorized (SPM)	100

There are two recreation cabins and two miles of trail at the head of Long Bay and from Three Finger Cove. Many anchorages and beaches used by boaters and kayakers provide entry points to the uplands. Areas where opportunities for primitive recreation are particularly outstanding include Port Bainbridge, Icy Bay, Whale Bay, Kings Bay, Kings River, and the Nellie Juan Lake area. In these and other areas, topography, ice, recently deglaciated landscapes, and an almost total lack of development require skill, challenge, and endurance.

Motor Vehicle Recreation

This area is closed to motor vehicle uses year-round except for subsistence and traditional activities. Historic motor vehicle use of the uplands within this area is generally limited to occasional aircraft landings on icefields, lakes, and gravel bars. In recent years, snowmachine use has grown in the Kenai Mountains above Whittier and via the South Fork of the Snow River. The snowmachine use is often focused in late winter and varies with snow depth, especially in the South Fork of the Snow River. Extensive motor vehicle use in the form of power boats and aircraft occurs adjacent to the uplands.

Other Values

Ecological, geological, or scenic features

The area offers spectacular scenery with tidewater glaciers and large granite protrusions climbing out of the ocean. The Nellie Juan River valley is one of only two low passes into Kenai Peninsula from western Prince William Sound and includes unique watershed, wildlife, and ecological features. The Nellie Juan River is recommended for wild river classification under the Wild and Scenic Rivers Act.

Western Prince William Sound has more tidewater glaciers than any other geographic region in North America. This inventoried area includes examples in Blackstone Bay, Port Nellie Juan, Icy Bay, and Nassau Fiord. Tebenkof Glacier is the longest valley glacier in Prince William Sound and is located near Cochrane Bay. Examples of glacial retreat and post-glacial plant and animal succession can be found at the Nellie Juan Glacier, Contact Glacier, Chenega Glacier, and Tiger Glacier.

The wildlife in the Nellie Juan Inventoried Area includes habitat for a spectacular mix of northern mammal species, sea/water/upland birds and mammals, forested habitats, and alpine species that offers many opportunities for study and viewing. The marine/upland/glacier interface provides exceptional birding and wildlife viewing.

Cultural and historic features of value

The area has a variety of heritage sites, including mining ruins, cabin ruins, culturally modified trees, and the ruins of the Nellie Juan Cannery in McClure Bay.

Features of scientific or educational value

The area contains the Wolverine Glacier Research Natural Area, representing a mid-elevation glacier with a diversity of tundra plant communities. Extensive glaciology research has occurred at the site since the mid-1960s (USDA 2007d). Blackstone Bay research natural area was proposed in the 1984 Forest Plan but was not designated. The area proposed encompasses the termini of three glaciers, two of which, Beloit and Blackstone, are relatively stable tidewater glaciers.

Portions of the Nellie Juan inventoried area were oiled during the EVOS, and much research has been conducted on the effects of the spill on wildlife and habitats and how those species have recovered over time. Some of the most notable wildlife population work in Alaska has been conducted in EVOS-affected areas.

Manageability

Shape and configuration of the area

The state and private land boundaries within the area are not well defined. State land below the mean high tide line is also poorly defined. The eastern boundary is the watershed dividing line between the Nellie Juan Inventoried Area and the Kenai Mountains Inventoried Area. The Kenai Mountains Inventoried Area is immediately to the west, and the College Fiord Inventoried Area is to the north. The Prince William Sound Islands Inventoried Area is just east of the area. The area is currently managed according to the precepts of the 1964 Wilderness Act, with ANILCA provisions, and has high manageability potential as designated wilderness. Its size, shape and configuration allow for maintenance of wilderness character over a broad area. On all sides, the land is undeveloped, rugged, and heavily glaciated. The marine waters bordering the area provide additional buffering from development.

Management of adjacent lands

Intertidal lands bordering the area are managed by Alaska Department of Natural Resources to be consistent with the Nellie Juan-College Fiord WSA management intent. Marine State Parks in the area are managed to maintain the area as wildlands.

Non-Federal lands

There are 212,160 acres of state and private land within the inventoried area. Very few state and private lands are adjacent to major roads. Most non-National Forest System lands would require access from Prince William Sound or from the west through the Kenai Mountain Inventoried Area. Wilderness designation would affect land access to state and private lands.

The surface estate of 20,235 acres was purchased using EVOS restitution funds. The result is a split estate: the Federal government owns the surface estate on these lands, while the subsurface estate is retained by the Chugach Alaska Corporation and may be developed.

Legally established rights or uses

Land use authorizations

Special use authorizations in the area include outfitter/guide permits for boat based hiking, kayak supported camping, freshwater fishing, big game hunting, and boat based ski touring. There are upland support camps under special use permit for the ANILCA setnet fishing in Main Bay. There are two private cabins and one warehouse authorized through ANILCA. The Main Bay Fish Hatchery is under special use permit. There are also research buildings, equipment, and installations within the Wolverine Glacier RNA. Rock anchors have been authorized on Evans Island. Legally established rights or uses in the area are generally consistent with wilderness character. The authorization with the highest potential to impact wilderness character is the Main Bay Fish Hatchery. All legally established rights or uses in this area are managed to maintain wilderness character in accordance with the Wilderness Act and ANILCA.

Minerals

There is low or no mineral activity in this area and no mining claims. The Forest Service currently has no plans of operations for mining activities, but mining activities may be occurring that do not require authorization.

Federal or state laws affecting availability as wilderness

The Alaska National Interest Lands Conservation Act (ANILCA) added a portion of this area to the Chugach National Forest in 1980 and included it in the designation of the Nellie Juan-College Fiords Wilderness Study Area. This area has been managed to maintain wilderness character since 1980 as a result of its designation.

Prince William Sound Islands Inventoried Area

Gross acres: 139,790
National Forest System acres: 120,000

Apparent Naturalness

Appearance and Developments

The majority of this inventoried area is natural appearing, where only ecological change has occurred; along with the Nellie Juan and College Fiord Inventoried Areas, this area has been managed to maintain its wilderness character as part of the Nellie Juan-College Fiord Wilderness Study Area since being designated in 1980. This area has a very high degree of natural integrity. Overall, the area appears primarily affected by the forces of nature, with limited modern human development. There are no recreational cabins, hardened campsites, or trails in this inventoried area. Knight Island, the largest island in the area, has the greatest natural appearance and least amount of modern development.

There is a Forest Service fisheries improvement project at Solf Lake including a dam and fishway. The Naked Island Communication Site is at approximately 1,200 feet elevation and consists of buildings, antennas, generators and helicopter pads. An oyster farm and associated buildings are located on state lands adjacent to the inventoried area on Perry Island. An abandoned FAA communication site with buildings is located on the Dutch Island Group. Recreational impacts are present along popular shorelines and near common anchorages, especially along Perry Island, Naked Island Group, and Knight Island. They are generally limited to small areas of disturbed vegetation. Most of the area shows little or no impacts related to recreation.

Ecological Conditions/Composition of Plant and Animal Communities

Vegetation

The vegetation composition and structure of this area is primarily the result of natural processes. Non-native plants are rare in the area.

Fish Resource

While four of the five Pacific salmon species occur in this area (Chinook are not present), pink salmon are the most abundant and widely distributed. Dolly Varden char and cutthroat trout also occur in this area, although Dolly Varden are more common. There has been very little disturbance to the natural condition of the freshwater habitat. However, commercial fisheries catch a substantial portion of the wild pink and chum salmon each year with the 1990 to 2011 average interception rates of 40 percent and 27 percent, respectively. Therefore, the number of fish reaching the spawning grounds has been reduced from the natural historical condition as has been the rate of infusion of marine derived nutrients to the watershed ecosystems from decomposing salmon carcasses.

Four large fish hatcheries are located in Prince William Sound, and, although most of the returning fish they produce are either caught or return to the facilities, a significant number stray into natural production area and mix with wild salmon. Brenner et al. (2012) found that streams in southwestern Prince William Sound were particularly vulnerable to large numbers of stray hatchery fish. It is likely that many of the pink salmon populations in this area are mixtures of hatchery strays and wild fish, with hatchery fish comprising from 10 percent to 25 percent of the spawning population. Such levels likely risk the natural genetic character of wild pink salmon and reduce their productivity. Overall, human influence on the fish resource that relies on habitats within the borders of this study area has probably had a “slight impact” on its natural character.

Wildlife Resource

All native wildlife associated with the habitats in this roadless area are expected to be present in sustainable numbers, including the resident and migratory shore and seabirds (AKNHP 2013). Dominant predators, such as brown bears and wolves, may be absent from some of the more isolated islands, making those islands protected bird sanctuaries. Foxes and other furbearers were introduced to the islands of the Prince William Sound inform the late 1700s through the early 1900s. Most of the foxes and non-native furbearers died out due to disease and overutilization of their habitat. The EVOS oiled major portions of this group of islands. Many of the affected wildlife species have been classified by the EVOS Trustee Council as recovered or appear to be recovering (EVOS TC 2014). Pigeon guillemots and marbled murrelets have not recovered and pigeon guillemot populations remain far below historic levels. An EVOS funded project to reduce mink on the Naked Island Group was initiated in 2014 by the USFWS to help restore pigeon guillemots and help restore a more natural balance. Federally-listed Steller sea lions (FE) haul out in several off-shore rocks. Haul outs are buffered from disturbance as federally designated critical habitat. Wildlife are expected to retain natural interactions with each other and their environment with minimal human interference. Human activities have the potential of impacting nesting sea and shore birds during their crucial breeding period.

Opportunities for Solitude or Primitive and Unconfined Recreation

Opportunity for Solitude

The opportunity for solitude in the area is generally high, and is outstanding away from shorelines and outside of the peak visitation months of June through August. Along popular shorelines throughout the inventoried area, the presence of boats on adjacent marine waters represents another common impact to solitude. In some areas, especially where commercial fishing occurs, visitors may commonly hear or see marine vessels during the peak summer months while along shore. The majority of these impacts originate outside of National Forest System lands and during the peak summer months These effects are most common along shorelines closest to Whittier and the fish hatchery on Esther Island, including the Dutch Group, Bald Head Chris, and Perry Island. Knight Island, the most distant part of the inventoried area from Whittier and Valdez, is unique for the low level or absence of marine traffic. An exception is Lower Passage along northern Knight Island, where commercial fishing vessels may be present during fishing season.

Forest Service monitoring shows the sights and sounds of vessels quickly diminish with distances of a quarter mile or less from the shoreline boundaries of the WSA (USDA 2012; USDA 2013). Topography, forest screening, and distance from the WSA boundary often eliminate impacts to solitude originating on marine waters. This is particularly true on Knight Island, the largest island in the area. Knight Island is mountainous and comprised of twelve primary bays. The steep shores and complex geography of coves and inlets offer a reprieve from vessel noise that is unique in western Prince William Sound, even during the peak summer season of visitation. Drier Bay, Lower Herring Bay, Mummy Bay, and Johnson Bay are examples.

The village of Chenega Bay is within 7 air miles and 15 boating miles of the area. Whittier is about 25 miles from the northwestern edge of the area. Both of these communities provide boating access to the inventoried area. There are no established landing sites within the area. All aircraft access is by floatplane to saltwater or large lakes.

Opportunity for Primitive Recreation

ROS Class	Acres
Primitive (P)	12,700
Semi-primitive Non-motorized (SPNM)	105,700

The opportunity for primitive recreation is moderate to high, with very little recreation development and a high level of challenge for users, but also a limited diversity of recreation opportunities. Areas near the shore are popular with boat or kayak based recreation users. Commercial fishing is present but not as heavy as near the fish hatcheries. The National Forest System lands within the area are surrounded by Prince William Sound and are influenced by the marine based recreation and commercial activities that take place there. There are no recreation cabins or trails within the area. Knight Island offers numerous slopes comprised of muskeg and subalpine meadows, enabling hiking, skiing, hunting, and wildlife viewing opportunities greater than the area's other islands.

Motor Vehicle Recreation

This area is closed to motor vehicle uses year-round except for subsistence and traditional activities. There is essentially no historic motor vehicle use of the uplands within this area. Extensive motor vehicle use in the form of powerboats and, to a lesser degree aircraft, occurs adjacent to the uplands.

Other Values

Ecological, geological, or scenic features

The area has high scenic values with islands, mountains, and rain forest, along with ocean views that include both small bays and open expanses. Islands near Naked Island and Perry Island are known for parakeet auklet, pigeon guillemot, and other birdlife. Knight Island was uplifted during the 1964 earthquake. Its shores are bordered by Sitka alder and young spruce, evidence of the area's seismic history.

Cultural and historic features of value

There are 101 known cultural sites within the area. They include mining ruins, cabin ruins, culturally modified trees, a former military installation on Smith Island, and others.

Features of scientific or educational value

Knight Island and nearby islands were heavily oiled during the EVOS and an estimated 16,000 gallons of oil remain in intertidal areas. Extensive oil spill research has occurred. Many wildlife studies in southcentral Alaska have occurred in the EVOS spill area in order to evaluate impacts from the EVOS and species recovery. This contribution to science on baseline wildlife and trends is significant. Also, shorebirds on islands in this area have been surveyed for decades. The data contributes to overall evaluation of the health of populations and the ocean systems that sustain them.

Manageability

Shape and configuration of the area

All of the area falls within the Nellie Juan-College Fiord Wilderness Study Area established by ANILCA and is being managed to maintain its wilderness character until congressional action is taken. The primary land management goal is preservation of wilderness character pending a determination by Congress. The state and private land boundaries within the area are not well defined.

Management of adjacent lands

The Nellie Juan inventoried area is to the west. The College Fiord inventoried area is to the north. West of the Prince William Sound Islands inventoried area are the Montague and Fidalgo-Gravina inventoried areas. They are separated from this inventoried area by 10 to 30 miles of water. Intertidal lands and state marine parks bordering the area are generally managed by Alaska Department of Natural Resources to be consistent with the Nellie Juan-College Fiord WSA management intent (ADNR 1995).

Non-Federal lands

There are 21,490 acres of state and private lands within the inventoried area. All state and private lands would require access from Prince William Sound. Wilderness designation could affect access to some of these lands.

The surface estate of 1,600 acres was purchased using the EVOS restitution funds. The result is a split estate; the Federal government owns the surface estate on these lands, while the subsurface estate is retained by the Chugach Alaska Corporation and may be developed.

Legally established rights or uses

Land use authorizations

Special use authorizations in the area include outfitter/guide permits for boat-based hiking, kayak-supported camping, freshwater fishing, big game hunting, and boat based ski touring. Naked Island Communication Site and various research permits occur for oil spill related projects, bird habitat, seismic activity, whales, and other projects. All legally established rights or uses in this area are managed for maintenance of wilderness character and according to the precepts of the 1964 Wilderness Act and ANILCA provisions.

Minerals

There is low or no mineral activity in this area and no mining claims. The Forest Service currently has no plans of operations for mining activities, but mining activities may be occurring that do not require authorization.

Federal or state laws affecting availability as wilderness

ANILCA included this area in the designation of the Nellie Juan-College Fiords Wilderness Study Area. This area has been managed to maintain wilderness character since 1980 as a result of its designation.

College Fiord Inventoried Area

Gross acres: 1,149,570
National Forest System acres: 1,114,290

Apparent Naturalness

Appearance and Developments

Forest Service wilderness character monitoring indicates an overall absence of development throughout the area and the adjacent landscape. Overall, the area appears primarily affected by the forces of nature, with minimal imprints from modern human activity. However, certain exceptions exist.

The Cannery Creek Fish Hatchery in Unakwik Inlet is the only area of modern development in this inventoried area. It is limited to approximately five acres and includes a fish hatchery, dam, diesel generator system, short road, and several buildings. The hatchery and related developments are managed according to ANILCA 1315(b), which states the site must be "constructed, managed, and operated in a manner that minimizes adverse impacts on the wilderness character of the area." Evidence of past mining activity is present in various locations throughout the area. The largest site is Granite Mine, along western Port Wells. Two vintage trucks, a dilapidated stamp mill, remnants of a corduroy road, and other associated ruins are present. As a National Register Eligible Site, it is part of the cultural and historical landscape of the area.

Some timber harvesting, totaling about 250 acres, has occurred in the Port Wells, Esther Passage, and lower College Fiord areas. Logging and road construction related to the harvests is substantially unnoticeable and are reverting to natural forest conditions.

Recreational improvements are limited to three recreation cabins with trails providing access to one of these from saltwater. Recreational impacts are present along popular shorelines in Harriman Fiord, Barry Arm, Port Wells, and other areas, but are generally limited to small areas of disturbed vegetation. Most of the area shows little or no development or impacts related to recreation.

The northern and eastern edge abuts state land, which is essentially undeveloped. The eastern boundary is along Valdez Arm and undeveloped land. Numerous glaciers surround the northern, eastern, and western boundary of the area making it unlikely any development will encroach. This area has a very high degree of natural integrity. Most long-term ecological processes are intact and operating. While some evidence of human activity exists (e.g., mining operations, trails, and cabins), these activities have had little or no effect on the natural appearance of the area.

Ecological Conditions/Composition of Plant and Animal Communities

Vegetation

The vegetation composition and structure of this area is primarily the result of natural processes. Non-native plants are rare in the area.

Fish Resource

Salmon are abundant in this area with 129 total populations identified and all five species of Pacific salmon represented. Dolly Varden char and cutthroat trout also occur in this area. Although pink and chum salmon are the dominant species, several of the sockeye salmon populations are quite large. There has been very little disturbance to the natural condition of the freshwater habitat. However, commercial fisheries catch a substantial portion of the wild pink and chum salmon each year with 1990 to 2011

average interception rates of 40 percent and 27 percent, respectively. Fishery impact rates on wild sockeye salmon populations were not available. Removing returning salmon via fisheries means that the number of fish reaching the spawning grounds has been reduced from the natural historical condition. To some extent this has reduced the food supply for fish eating species, such as bears and bald eagles, as well as lessened the rate of infusion of marine derived nutrients into the watershed ecosystems from decomposing salmon carcasses.

Four large fish hatcheries are located in Prince William Sound, and, although most of the returning fish they produce are either caught or return to the facilities, a significant number stray into natural production areas and mix with wild salmon. Brenner et al. (2012) found that streams in proximity to Wally Noerenberg Hatchery (Ester Island) and Cannery Creek Hatchery (Unakwik Sound) are likely to contain mixtures of hatchery and wild fish, with hatchery fish comprising from 5 percent to 25 percent of the spawning population. Such levels may risk the natural genetic character of wild fish and reduce their productivity. Overall, human influence on the fish resource that relies on habitats within the borders of this study area has probably had a "slight impact" on its natural character.

Wildlife Resource

All native wildlife associated with the habitats in this area are expected to be present in sustainable numbers. Dominant predators, such as brown bears and wolves, and smaller fur bearers are absent from some of the more isolated islands (AKNHP 2013), providing excellent breeding habitat for sea birds. There is a concentration of black oystercatcher habitat in this area. None of the native terrestrial wildlife are proposed or listed in compliance with the ESA, but there is designated critical habitat for Steller sea lions (FE). The ecological processes and some of the shoreline habitat in College Fiord were affected by EVOS, but most of the bays were not directly oiled. Nonetheless, some lingering oil may still be buried. Wildlife are expected to retain natural interactions with each other and their environment with minimal human interference, although human activities have the potential of impacting natural behaviors of nesting sea and shore birds and sea mammals.

Opportunities for Solitude or Primitive and Unconfined Recreation

Opportunity for Solitude

Monitoring shows outstanding opportunities for solitude exist throughout much of the area. Using as a measure the distance from roads, trails, town sites, and other development, the area includes some of the most remote lands within the Chugach National Forest. Access is only possible by aircraft or boat. Virtually all aircraft access is by floatplane to saltwater or large lakes. Limited landings also occur on the glaciers by aircraft fitted with skis. There are no established aircraft landing sites in the area. The area is large with a high degree of topographic screening. The distance from the perimeter to the core is more than 25 miles. Valdez is about 15 air miles and 30 boat miles from its eastern edge. Whittier is about 14 miles by air and boat from its southern edge. Forest Service monitoring show opportunities for solitude are particularly outstanding in upper College Fiord, upper Unakwik Inlet, Cedar Bay, Wells Bay, much of Columbia Bay north of Heather Island, and in various other locations.

Along popular shorelines throughout the inventoried area, the presence of boats on adjacent marine waters represents another common impact to solitude. In some areas, especially where commercial fishing occurs, visitors may commonly hear or see marine vessels during the peak summer months while along shore. Tour vessels and private recreation boats are common on waterways closest to Whittier and in popular areas such as Port Wells, Esther Passage, and Harriman Fiord. The majority of the impacts originate outside of National Forest System lands and during the peak summer months. Outside of the peak summer months, commercial fishing and vessel traffic is greatly reduced. Forest Service monitoring shows visitors may spend several days in the area between October and May without experiencing any

sights or sounds of marine vessels. Forest Service monitoring shows the sights and sounds of vessels quickly diminish with distances of a quarter mile or less from the shoreline boundaries of the WSA. Topography, forest screening, and distance from the WSA boundary often eliminate impacts to solitude originating on marine waters.

Recreational activities can also impact opportunities for solitude, especially during the peak summer months. Harriman Fiord and some locations along western Port Wells are among the most popular camping and kayaking sites in the inventoried area. Visitors there may encounter on-shore recreationists.

Opportunity for Primitive Recreation

Forest Service wilderness character monitoring shows the area offers outstanding opportunities for primitive and unconfined recreation. Using distance from roads and towns as a measure, this inventoried area contains some of the best opportunities for primitive recreation within the Chugach National Forest. Kayaking, camping, hunting, fishing, skiing and other non-motorized activities that rely on physical skills and self-reliance are popular in the area. Opportunities for rescue, shelter, and motor vehicle assistance are generally rare, especially away from popular shorelines and outside of the peak summer season.

ROS Class	Acres
Primitive (P)	600,400
Semi-primitive Non-motorized (SPNM)	513,900

There are seven miles of trail and three recreation cabins in the area. Areas where opportunities for primitive recreation are particularly outstanding include upper College Fiord, upper Unakwik Inlet, Cedar Bay, Wells Bay, and especially Columbia Bay north of Heather Island, where topography, ice, recently de-glaciated landscapes and lack of development require skill, challenge, and endurance.

Motor Vehicle Recreation

This area is closed to motor vehicle uses year-round except for subsistence and traditional activities.

Other Values

Ecological, geological, or scenic features

Mt. Marcus Baker, the highest mountain in the Chugach Range, is located at the northern edge of the unit. The terrain is extremely rugged with barren rock cliffs rising from saltwater to over 7,000 feet in elevation. Numerous tidewater and hanging glaciers can be seen from saltwater. Western Prince William Sound has more tidewater glaciers than any other geographic region in North America. Columbia Glacier, located in the northeastern part of the inventoried area, is among the largest tidewater glacier systems in North America. It has been undergoing rapid retreat since the early 1980s and is one of the largest contributors of fresh water to the marine environment in Alaska. The Eaglek area includes Cascade Falls and the head of Cascade Bay. The falls drop 75 to 100 feet directly into saltwater. The long protected bays offer excellent habitat for shorebirds and marine mammals.

The recently de-glaciated area near Columbia Glacier offers an early successional landscape that is of interest to botanists, geologists, and fish and wildlife, and climate change researchers. The glacier, ice field and fresh water discharge are of interest to climate, glacier, and other researchers. The area's glacial history and high scenic qualities are valued by recreationists, tourists, and outfitters and guides.

Cultural and historic features of value

There are 96 known cultural sites within the area. Historic mining activity includes lode mines at Harrison Lagoon, Portage Mine near Poe Bay, and Mineral King Mine at Bettles Bay. There are 109 old mines within the area and 54 old mining claims, most within the Bettles Bay and Hobo Bay area.

Features of scientific or educational value

Three potential research natural areas have been identified in the area. The 1984 Forest Plan proposed the establishment of RNAs in the Columbia Glacier-Granite Cove and Harvard Glacier areas. To date, neither has been designated. The 2002 Forest Plan proposed RNAs at Columbia Glacier-Granite Cove and Cedar Bay. Cedar Bay was not designated, but there is continued interest in its RNA potential. Yellow-cedar (*Callitropis nootkatensis*) die-off in British Columbia and within the Tongass National Forest in southeast Alaska has heightened interest in Cedar Bay where the species is thriving (Hennon and Trummer 2001). The northern-most extension of yellow-cedar is in Wells Bay, Cedar Bay, Unakwik Inlet, Glacier Island, and lower Columbia Bay.

Manageability

Shape and configuration of the area

The area is part of the Nellie Juan-College Fiord Wilderness Study Area identified in ANILCA and is being managed to maintain its wilderness character until congressional action is taken. The primary land management goal is preservation of wilderness character pending a determination by Congress. The area is adjacent to the Twentymile inventoried area to the west, the Nellie Juan and Prince William Sound Island inventoried areas to the south and the Fidalgo-Gravina inventoried area to the east. Except for the Twentymile inventoried area, the upland portions of the adjacent inventoried areas are separated by the waters of Prince William Sound. The eastern boundary is along Valdez Arm, two State Parks, and other undeveloped lands. The state and private land boundaries within the area are not well defined. Numerous glaciers surround the northern, eastern and western boundary of the unit making it unlikely development will encroach on the area. About 771,610 acres were recommended for wilderness area designation in 2002 as part of the previous Forest Plan revision.

Management of adjacent lands

The northern and eastern edges adjoin state land that is presently undeveloped. Intertidal lands bordering the area are managed by Alaska Department of Natural Resources to be consistent with the Nellie Juan-College Fiord WSA management intent. State Marine Parks in the area are generally managed as wildlands with limited development.

Non-Federal lands

There are 35,280 acres of state and private lands within the inventoried area. All state and private lands would require access from Prince William Sound.

Legally established rights or uses

Land use authorizations

Special use authorizations in the area include outfitter/guide permits for boat based hiking, kayak supported camping, freshwater fishing, big game hunting, and boat based ski touring. Cannery Creek Fish Hatchery is under special use permit, with improvements including buildings, road, pipeline and other infrastructure. Glacial and seismic research is conducted in Columbia Bay, and there are also two communication sites in Valdez Arm that monitor tanker traffic in Prince William Sound.

Minerals

There are dozens of lode mining claims in this area at Hobo Bay in two blocks including the historic Granite Mine. The Forest Service currently has no plans of operations for mining activities within this area but additional mining activity may be occurring that does not require authorization.

Federal or state laws affecting availability as wilderness

ANILCA added a portion of this area to the Chugach National Forest in 1980 and included it in the Nellie Juan-College Fiords Wilderness Study Area. This area has been managed to maintain wilderness character since 1980 as a result of its designation.

Fidalgo-Gravina Inventoried Area
Gross acres: 530,310
National Forest System acres: 315,350

Apparent Naturalness

Appearance and Developments

This area has a very high degree of natural integrity. The majority of this inventoried area is natural appearing, where only ecological change has occurred. Most long-term ecological processes are intact and operating. While some evidence of human activity exists, these activities have had little or no effect on the natural appearance of the area, and very few developments remain.

Ecological Conditions/Composition of Plant and Animal Communities

Vegetation

The vegetation composition and structure of this area is primarily the result of natural processes. Non-native plants are rare in the area. In the 1990s when the land was privately-owned, about 7,340 acres of forest on the Knowles Head Peninsula was logged. The Forest Service now manages the surface estate of these lands and is currently developing a plan to restore habitat in this area.

Fish Resource

Pink and chum salmon are the most abundant salmon species in this area; however, several sockeye and coho populations also occur. In total, 129 salmon populations were identified in this area, many occurring in relatively short and small stream systems. Dolly Varden char and cutthroat trout also occur in this area. With the exception of past logging that has occurred on Knowles Head, the majority of the aquatic habitat is in natural condition. However, this is the immediate vicinity of the EVOS and impacts may be still be occurring on the natural ecosystems.

Commercial fisheries catch a substantial portion of the wild pink and chum salmon each year with 1990 to 2011 average interception rates of 40 percent and 27 percent, respectively. Removing returning salmon via fisheries means that the number of fish reaching the spawning grounds has been reduced from the natural historical condition. To some extent this has reduced the food supply for fish eating species, such as bears and bald eagles, as well as lessened the rate of infusion of marine derived nutrients into the watershed ecosystems from decomposing salmon carcasses.

Four large fish hatcheries are located in Prince William Sound and although most of the returning fish they produce are either caught or return to the facilities, a number stray into natural production area and mix with wild salmon. Brenner et al. (2012) reported for the streams in this inventoried study area that hatchery origin pink salmon typically comprised from 2 percent to 10 percent of the spawning population. Such levels have the potential to risk the natural genetic character of wild fish and reduce their productivity. Overall, human influence on the fish resource that relies on habitats within the borders of this study area has probably had a "slight impact" on its natural character.

Wildlife Resource

All native wildlife associated with the habitats in this roadless area are expected to be present in sustainable numbers, including resident and migratory shore and seabird, and dominant predators. Mountain goats are common in the alpine areas. None of the terrestrial wildlife in this roadless area are proposed or listed in compliance with the ESA. It is suspected that the European black slug (*Arion* spp) which is well-established in Cordova, may be moving into this into this inventoried area, although no

definitive surveys have been conducted. If they become established in the area, natural ecological processes may be altered. The thinning of logged lands at Knowles Head could benefit harlequin ducks, marbled murrelets, and other wildlife when that forested land is treated to encourage the restoration of the old growth forest conditions that were present before the logging. Wildlife are expected to retain natural interactions with each other and their environment with minimal human interference

Opportunities for Solitude or Primitive and Unconfined Recreation

Opportunity for Solitude

Opportunities for solitude in the area are moderate to high, although where the edge of the unit abuts Prince William Sound it is influenced by marine based recreation and commercial activities. The area, however, provides a high degree of topographic screening. Access is almost exclusively by floatplane or boat. There are several anchorages and beaches used by boaters and kayakers that provide entry points to the uplands. The distance from the perimeter to the core is three to five miles.

Opportunity for Primitive Recreation

The opportunity for primitive recreation is high, with a high level of challenge for the recreation user and few or no developments in most of the area.

ROS Class	Acres
Primitive (P)	17,900
Semi-primitive Non-motorized (SPNM)	213,900
Semi-primitive Non-motorized (SPNMA)	25,000

There are 31 miles of trail with a low level of development, and one recreation cabin in the unit at the head of Jack Bay.

Motor Vehicle Recreation

The area is closed to motor vehicle use year-round, except for subsistence use. However, unauthorized snowmachine use in the northern section of this area has been documented, and Valdez residents have expressed a desire to open this area to over-snow motor vehicle use.

Other Values

Ecological, geological, or scenic features

Populations of the Alaska Region sensitive plant sessileleaf scurvygrass (*Cochlearia sessilifolia*) occur in the area. The *Cochlearia sessilifolia* Plant Association is considered of conservation concern by the Alaska Natural Heritage Program (Boggs et al. 2014).

Cultural and historic features of value

There are four known cultural sites within the area. The town of Elamar, near Tatitlek, flourished as a copper, gold, and silver mining center during the early 1900s. The area produced a large amount of copper in the early 1900s.

Features of scientific or educational value

The area contains the Olsen Bay Creek Research Natural Area where non-manipulative anadromous fisheries research was conducted for more than 50 years (USDA 2007c).

Manageability

Shape and configuration of the area

The boundaries of the management area are poorly defined where Forest Service land abuts state or private land. The northern edge of the unit, which is the national forest boundary with BLM land, is also poorly defined on the ground. There are several portions of the unit that are completely surrounded by other ownership. Several small parcels in this unit are adjacent to the Tasnuna River inventoried area but are separated from the rest of the unit by state land.

Management of adjacent lands

The Sheridan Glacier inventoried area abuts the eastern boundary of the unit and the Hinchinbrook-Hawkins inventoried area is to the south. The national forest boundary forms the northern boundary of the unit. Private land takes up most of the coastline and the community of Tatitlek is within the exterior boundary of the area. Cordova lies just to the east of the area across Orca inlet. Valdez is five miles to the north by boat across Valdez Narrows. The Wrangell-Saint Elias National Park and Preserve Wilderness Area is about 20 miles to the northeast.

Non-Federal lands

There are 275,010 acres of state and private lands within the boundaries of this area. Another 58,460 acres are EVOS-acquired lands, where the surface estate was purchased and is managed by the Forest Service. Chugach Alaska Corporation retained the subsurface estate, which may be developed.

Easements across private land are provided at strategic locations to provide access to National Forest System lands away from the shore. There are several parcels within this unit that are completely surrounded by private land. Almost all state and private lands would require access from Prince William Sound. Wilderness designation could affect access to some state and private lands, and isolated parcels would be difficult to manage.

Legally established rights or uses

Land use authorizations

Special use authorizations in the area include outfitter/guide permits for boat based hiking, freshwater fishing, and big game hunting. There is a communication site lease issued on Jack Peak, accessible only by helicopter only.

Minerals

Chugach Alaska Corporation is exploring the potential development of its subsurface estate in the Port Gravina area, which could create substantially noticeable impacts. Except for this potential development, there is no/low mineral activity in this area and no mining claims. The Forest Service currently has no plans of operations for mining activities, but mining activities may be occurring that do not require authorization.

Federal or state laws affecting availability as wilderness

None.

Montague Island Inventoried Area

Gross acres: 254,310
National Forest System acres: 204,500

Apparent Naturalness

Appearance and Developments

The majority of this inventoried area is natural appearing, where only ecological change has occurred. While some evidence of human activity exists (e.g., old logging operations and cabins), these activities have had little or no effect on the natural appearance of the area. No inventory of scenic integrity has been conducted to date.

Ecological Conditions/Composition of Plant and Animal Communities

Vegetation

The vegetation composition and structure of this area is primarily the result of natural processes. Non-native plants are rare in the area. About 2,420 acres of logging has occurred on National Forest System lands on Montague Island.

Fish Resource

The streams of Montague Island are major producers of salmon, particularly pink and chum salmon. No Chinook salmon populations occur within this area, although coho salmon and a few sockeye populations exist, as well as Dolly Varden char and cutthroat trout. With exception of approximately 2,500 acres of logging, there has been very little disturbance to the natural condition of the freshwater habitat. However, commercial fisheries catch a substantial portion of the wild pink and chum salmon each year with 1990 to 2011 average interception rates of 40 percent and 27 percent, respectively. It should be noted these impact estimates are for the entire Prince William Sound region and probably overestimate the impact of these fisheries on populations from these outside locations. Regardless, as a result of this fishing impact, the number of fish reaching the spawning grounds has likely been reduced from the natural historical condition, as has been the rate of infusion of marine derived nutrients to the watershed ecosystems from decomposing salmon carcasses.

Four large fish hatcheries are located in Prince William Sound and, although most of the returning fish they produce are either caught or return to the facilities, a significant number stray into the natural production area and mix with wild salmon. Brenner et al. (2012) found that streams in southwestern Prince William Sound were particularly vulnerable to large numbers of stray hatchery fish. For streams on the west side of Montague Island, the level of mixing between wild fish and stray hatchery fish on the spawning grounds was quite high, with hatchery fish comprising from 10 percent to 25 percent of the spawning population. Such levels likely risk the natural genetic character of wild pink salmon and reduce their productivity. However, these levels are much lower on the eastern side of the island, with hatchery fish comprising less than two percent of the natural spawning population. Overall, human influence on the fish resource that relies on habitats within the borders of this study area has probably had a "slight impact" on its natural character.

Wildlife Resource

All native wildlife associated with the habitat in this inventoried area are expected to be present in sustainable numbers, (AKNHP 2013), except possibly the Montague Island marmot, black bears and wolves. The Montague Island marmot was first described in the early 1900s (Howell 1914, cited in Lance 2002b), but has not been seen since, with some limited searches were conducted in 1985 and 1999. The

more common hoary marmot is present on several of the islands and the low number of collections of Montague Island marmots leaves their taxonomic status (and therefore any protections) in limbo. The bays on the north end of Montague Island are some of the most productive for marine wildlife in the sound and have been listed by the National Oceanographic and Atmospheric Administration as a sensitive biological area for forage fish, seabirds, waterfowl, and sea mammals. Another animal, the Montague Island tundra vole (*Microtus oeconomus amakensis*) is thought to be endemic to the island. Sitka deer and mink were introduced in the 1950s. Brown bears occur on the island and have experienced periods of overharvest, but harvest is currently authorized in low numbers. Several species of owls and raptors are present, including short eared and boreal owls, which only occur in high latitudes. Montague Island is in important stop-over for geese and sand hill cranes.

Montague Island is a popular wildlife hunting destination for deer, brown bear and mountain goats. Hunting access is by boat and plane. Planes can use beaches for runways, but since much hunting occurs in the fall, impacts to nesting shorebirds may be limited. None of the native terrestrial wildlife in this roadless area are proposed or listed in compliance with the ESA, but the federally-listed Steller sea lions (FE) haul out in several off-shore rocks in this area and one rookery occurs on a marine rock outcrop east of the island. Designated haul outs and rookeries are designated critical habitat and sea lions are protected from disturbance by ESA buffers.

Montague Island was impacted by the EVOS, altered by the 1964 earthquake, and accumulates marine debris, including a large amount from the 2011 Japanese earthquake and tsunami. Overall, wildlife are expected to retain natural interactions with each other and their environment with minimal human interference, especially away from the coastline.

Opportunities for Solitude or Primitive and Unconfined Recreation

Opportunity for Solitude

The opportunity for solitude in the area is high. While the influence of marine activities is present, it is often several miles away. Fishing and hunting are the primary recreational uses of the area. Montague Island is the largest island in Prince William Sound but it is very narrow. The area is far from communities and recreational boat use in the area is light. The distance from the edge to the core is between two and 20 miles. Off-site activities include marine based activities, such as commercial fishing and freighter traffic. These activities are easily screened by topography.

Opportunity for Primitive Recreation

The opportunity for primitive recreation is high, with a high level of challenge for the recreation user and few or no developments in most of the area once away from the coast. There are nine miles of low development level trails and six recreation cabins in the area. Cabins are most popular in the late fall during fishing and hunting seasons.

ROS Class	Acres
Primitive (P)	2,500
Semi-primitive Non-motorized (SPNM)	202,000

Motor Vehicle Recreation

Extensive motor vehicle use in the form of powerboats and aircraft occurs adjacent to the uplands. From May 1 to November 30, the area is closed to motor vehicle use except for subsistence, and open from December 1 to April 30, snow conditions permitting. There is essentially no historic motor vehicle use of the uplands within this area, and access is limited to boat.

Other Values

Ecological, geological, or scenic features

The geologic uplift along the southern portion of the island, caused by the 1964 earthquake, presents a unique area to study geologic progression and succession. The Sitka Spruce Floodplain Old-Growth Plant Association is considered of conservation concern by the Alaska Natural Heritage Program and occurs in this area (Boggs et al. 2014).

As described previously, there are two species of mammals that may be endemic to the Island: Montague Island marmots and Montague Island voles. The last Montague Island marmot was found in1978, but may have been extirpated, since none have been seen since.

Cultural and historic features of value

There are 43 known cultural sites within the area.

Features of scientific or educational value

This inventoried area is the heart of the area impacted by the EVOS. Habitat restoration is being evaluated to benefit marbled murrelets and harlequin ducks, two species that have not yet recovered following the oil spill.

The area contains the Green Island Research Natural Area which includes old-growth forests, beaches uplifted by the 1964 earthquake, important haulout sites for harbor seals and Steller sea lions, marine bird colonies, and close linkages between terrestrial and highly productive marine environments (USDA 1997).

Manageability

Shape and configuration of the area

The National Forest System lands within the area are surrounded by Prince William Sound. The state and private land boundaries within the area are not well defined. State land below the mean high tide line is also poorly defined. The special-use road along the southern edge of Montague Island separates two small sections of the island from the rest of the inventoried area.

Management of adjacent lands

Private lands in the area have been logged in the past, but not in the past 20 or more years. The Village of Chenega Bay is within the external boundaries of the area. The Prince William Sound Inventoried Area is to the west and the Hinchinbrook-Hawkins Islands Inventoried Area is to the northeast.

Non-Federal lands

There are 49,810 acres of private and state lands within the inventoried area. All private and state lands would require access from Prince William Sound. Wilderness designation could affect access to these lands.

Legally established rights or uses

Land use authorizations

Special use authorizations in the area include outfitter/guide permits for boat based hiking, kayak supported camping, freshwater fishing, and big game hunting. There is a small lodge under special-use permit at Macleod Harbor. There are also small telemetry and seismic sites on the island.

Minerals

There is low or no mineral activity in this area and no mining claims. The Forest Service currently has no plans of operations for mining activities, but mining activities may be occurring that do not require authorization.

Federal or state laws affecting availability as wilderness

None.

Hinchinbrook-Hawkins Islands Area
Gross acres: 156,980
National Forest System acres: 145,260

Apparent Naturalness

Appearance and Developments
The majority of the area is natural appearing, where only ecological change has occurred. This area has a very high degree of natural integrity. Most long-term ecological processes are intact and operating. Little evidence of human activity exists (e.g., old mining operations and cabins), and these activities have had little or no effect on the natural appearance of the area. In very small portions of the area, there is evidence of summer motor vehicle use for subsistence access.

Ecological Conditions/Composition of Plant and Animal Communities
Vegetation
The vegetation composition and structure of this area is primarily the result of natural processes. Non-native plants are rare in the area. About 495 acres of logging has occurred on National Forest System lands meeting wilderness inventory criteria on Hinchenbrook Island.

Fish Resource
Pink and chum salmon are the most abundant salmon species in this area; however, several sockeye and coho populations occur as well. In total, 97 salmon populations were identified for this area, many occurring in relatively short and small stream systems. Dolly Varden char and cutthroat trout also occur in this area. With the exception of past logging that has occurred on Hinchinbrook Island, the majority of the aquatic habitat is in a natural condition.

Commercial fisheries catch a substantial portion of the wild pink and chum salmon each year with 1990 to 2011 average interception rates of 40 percent and 27 percent, respectively. It should be noted these impact estimates are for the entire Prince William Sound region and probably overestimate the impact of these fisheries on populations from these outside locations. Regardless, as a result of this fishing impact, the number of fish reaching the spawning grounds has likely been reduced from the natural historical condition as has been the rate of infusion of marine derived nutrients to the watershed ecosystems from decomposing salmon carcasses.

Although four large fish hatcheries are located in Prince William Sound, they are located at some distance from this inventoried area, and, as reported by Brenner et al. (2012), the incidence of stray hatchery fish mixing with wild fish on the spawning grounds is low. For streams on Hinchinbrook and Hawkins Islands, hatchery fish likely comprise no more than 2 percent of the natural spawning population. At such levels there is probably little risk to the genetic character and production of wild fish. Overall, the human influence on the fish resources within the borders of this study area has probably had a "slight impact" on its natural character.

Wildlife Resource
All native wildlife associated with the habitats in this roadless area are expected to be present in sustainable numbers, including the dominant predators and resident and migratory shore and seabirds common in Prince William Sound (AKNHP 2013). Black bears are thought to be intermittent visitors to Hinchenbrook Island, and both black and brown bears occur on Hawkins Island. Wildlife are expected to retain natural interactions with each other and their environment with minimal human interference. None

of the native terrestrial wildlife in this roadless area are proposed or listed in compliance with the ESA. Hinchenbrook and Hawkins islands are in the ecological area affected by the EVOS but were not directly oiled. Most affected wildlife have been classified as "recovered" or "very likely recovered" by the EVOS Trustee Council, although some fish and marbled murrelets and pigeon guillemots are not recovering (EVOS TC 2014). Federally-listed Steller sea lions (FE) haul out in several off-shore rocks in this roadless area. Two haul outs are buffered from disturbance as federally designated critical habitat.

Opportunities for Solitude or Primitive and Unconfined Recreation

Opportunity for Solitude

The opportunity for solitude in the area is generally high. Off-site activities potentially affecting solitude include marine based activities, such as commercial fishing, freighter traffic, and recreational boating. The distance from the edge to the core is between two and four miles.

Opportunity for Primitive Recreation

ROS Class	Acres
Primitive (P)	91,100
Semi-primitive Non-motorized (SPNM)	29,000
Semi-primitive Motorized (SPM)	16,900

The opportunity for primitive recreation is high, with few developments in the area and a moderate to high level of challenge for the recreation user. There are three recreation cabins in the unit. There are no developed trails in the area, though 5 to 10 miles of user-created trails are used for subsistence purposes.

Motor Vehicle Recreation

Motor vehicle use is not allowed except for subsistence use from May 1 to November 30, with the exception of two small sections of Hinchinbrook Island. OHV use by local residents for subsistence has been documented in the southeast portion of Hinchinbrook and in a small area on Hawkins Island near Canoe Passage. From December 1 to April 30, the area is closed to motor vehicle use except for subsistence use and the same to areas on Hinchinbrook Island that are open to motor vehicle use in the summer.

Other Values

Ecological, geological, or scenic features

Populations of the Alaska Region sensitive plants Unalaska mist-maid (*Romanzoffia unalaschcensis*) and sessileleaf scurvygrass (*Cochlearia sessilifolia*) occur in the area. The *Cochelaria sessilifolia* Plant Association and Sitka Spruce Floodplain Old-Growth Plant Association are of conservation concern by the Alaska Natural Heritage Program and occur in this area (Boggs et al. 2014).

Cultural and historic features of value

There are 72 known cultural sites within the area. The area's history includes early settlement by Alaska Natives and Russian fur traders.

Features of scientific or educational value

A research natural area was proposed at Cutoff Creek in the 2002 Forest Plan but was not designated. The area contains old-growth Sitka spruce (*Picea sitchensis*) forests on alluvial soils. The cultural sites and locations of early settlement are of scientific and educational value.

Manageability

Shape and configuration of the area

The exterior boundaries are easily defined as the unit is made up of two islands. State and Native land boundaries within the unit are less clearly defined. State land below the mean high tide line is poorly defined on the ground. Native corporation selections, when conveyed, would create several small isolated parcels within the unit.

Management of adjacent lands

The closest inventoried area is Sheridan Glacier to the east. Orca Inlet and private land separate these two inventoried areas. Montague inventoried area is to the south across Hinchinbrook Entrance and the Fidalgo-Gravina Inventoried Area is to the north across Orca Bay.

Non-Federal lands

There are 20,940 acres of state and private lands within the inventoried area. Several sections of National Forest System land are completely surrounded by private land. Access to state and private lands is by Prince William Sound. Wilderness designation could affect access to these lands.

The surface estate of 8,310 acres was purchased using the EVOS restitution funds. The result is a split estate: the Federal government owns and manages the surface estate of these lands, while the subsurface estate is retained by the Chugach Alaska Corporation and may be developed.

Legally established rights or uses

Land use authorizations

Special use authorizations in the area include outfitter/guide permits for boat based hiking, fishing, and big game hunting. There is a communication site on Johnstone Point on Hinchinbrook Island, and a communication site, also on Hinchinbrook Island, to support Alyeska Pipeline.

Minerals

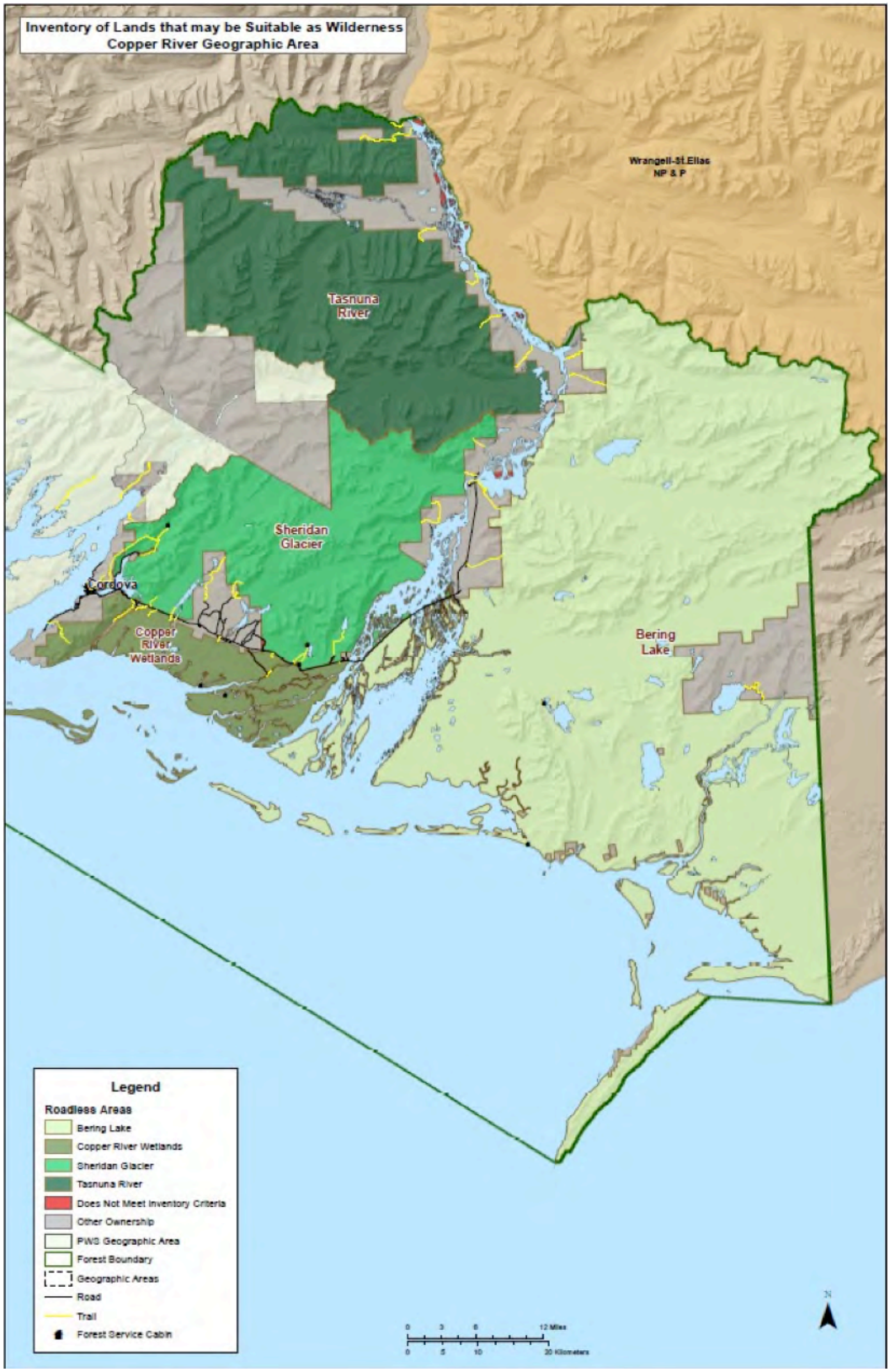
There is low or no mineral activity in this area and no mining claims. The Forest Service currently has no plans of operations for mining activities, but mining activities may be occurring that do not require an authorization.

Federal or state laws affecting availability as wilderness

None.

Copper River Delta Geographic Area

Map 5. Inventory of lands that may be suitable as wilderness in the Copper River Delta geographic area.



Copper River Wetlands Area

Gross acres: 97,180
National Forest System acres: 87,540

Apparent Naturalness

Appearance and Developments

The area has a very high degree of natural integrity. While some evidence of human activity exists, these activities have had little or no effect on the natural integrity of the area. The apparent naturalness has been only slightly affected by human activity. The majority of the area is natural appearing where only ecological change has occurred.

Ecological Conditions/Composition of Plant and Animal Communities

Vegetation

The vegetation composition and structure of this area is primarily the result of natural processes. Non-native plants are common in areas of human disturbance, especially near roads and along trails. The highly invasive aquatic plant elodea has been found in a number of locations in the area, including Eyak River and adjacent sloughs and ponds, and in lower Alaganik Slough and side sloughs.

Fish Resource

Although populations of Chinook salmon do not occur within this area, the remaining four species of Pacific salmon are present as is Dolly Varden char and cutthroat trout. In addition, this area is one of two locations within the Chugach National Forest where eulachon can be found (the other being Twentymile River). The wetland habitat that is characteristic of this area is a significant nursery area for juvenile salmon that originate here as well as the Sheridan and Bering inventoried areas. The character of this area was substantially changed as the result of the land uplift associated with the 1964 earthquake; however, natural processes dominate the existing aquatic habitat. Fishery impacts on these populations are thought to be at moderate levels. There are no hatchery salmon in this area other than sockeye salmon in transit to and from a large sockeye hatchery located 260 miles north in the upper Copper River watershed. Overall, the fish resources in this area, although in transition as a result of the 1964 earthquake, have had little impact from humans and probably are in a "nearly natural" state.

Wildlife Resource

All native wildlife associated with habitats in this inventoried area are expected to be present in sustainable numbers, including the dominant predators (AKNHP 2013). Wildlife are expected to retain natural interactions with each other and their environment with minimal human interference. None of the native terrestrial wildlife in this inventoried area are proposed or listed in compliance with the ESA. Moose were introduced to the Copper River Delta in 1958 and 1959 with the translocation of 23 calves. Moose in this area are separated from other moose populations by topography. The European black slug (*Arion* spp) is established in Cordova and may have expanded into this area. OHV use on the small barrier islands adjacent to the mainland likely has an impact on migratory birds, primarily during April and May.

Opportunities for Solitude or Primitive and Unconfined Recreation

Opportunity for Solitude

The opportunity for solitude in the area is low to moderate as a result of the area's small size, lack of topographic, vegetative screening, and many permanent off-site intrusions. There are also several

privately owned isolated cabins along the rivers and sloughs. The distance from the perimeter to the core is between 6 and 12 miles.

Opportunity for Primitive Recreation

The opportunity for primitive recreation is low to moderate as a result of little diversity of opportunities and few challenges to the recreational user, who most often use motor vehicles. The area provides settings for semi-primitive opportunities.

ROS Class	Acres
Primitive (P)	1,500
Semi-primitive Non-motorized (SPNM)	10
Semi-primitive Non-motorized (SPNMA)	65,900
Semi-primitive Motorized (SPM)	15,900
Roaded Natural (RN)	300

There are two recreation cabins in the area. Hunting and fishing are the most popular recreational activities, accessible primarily by motor boats.

Motor Vehicle Recreation

From May 1 to November 30, motor vehicle use on the mainland is prohibited except for subsistence use. On the small islands adjacent to the mainland, motor vehicle access is generally allowed in non-vegetated areas except on the Copper Sands. Most of the area is open to snowmachines from December 1 to April 30, snow conditions permitting, except for the Alaganik Slough area and Copper Sands. Powerboats are common on the waterways in this area during the summer.

Other Values

Ecological, geological, or scenic features

The Copper River Delta is a unit of the western shorebird reserve network and is one of the world's most significant wetlands. The geologic uplift along the coast caused by isostatic forces is a geologic phenomenon to study active geological progression and succession. The Barrier Islands, Uplifted Tidal Marsh, and Tidal Marshes and Mudflats biophysical settings occur in this area and are considered of conservation concern by the Alaska Natural Heritage Program (Boggs et al. 2014).

Cultural and historic features of value

There are three known cultural sites within the area.

Features of scientific or educational value

The area contains the Copper Sands Research Natural Area, which includes barrier islands and breakwater sandbars, and is a site of active vegetation succession on sand dunes (USDA 2007a). In the 1984 Forest Plan, a research natural area was proposed at Pete Dahl Slough to represent the extensive wetland ecosystems of the Copper River Delta, but it was not designated.

The Copper River Delta provides essential feeding habitat for millions of migratory shorebirds in the spring, including most of the world's dunlins and western sandpipers, essential fall migratory habitat for tule white-fronted geese, and nesting habitat for nearly all dusky Canada geese, a species recommended for species of conservation concern in the Assessment (USDA 2014).

This area has exceptional scientific value as a laboratory to learn about the transition response of a very large, productive wetland to a large natural disturbance (i.e., uplift from the 1964 earthquake). In addition, there are unique opportunities to study the impact of climate change on aquatic ecosystems.

Manageability

Shape and configuration of the area

The boundaries of the management area are poorly defined where Forest Service land abuts state or private land. The buffer between the Copper River Highway and the inventoried unit is not well defined on the ground. The mean high tide line defining state land is very difficult to locate.

Management of adjacent lands

The Sheridan Glacier inventoried area is separated from this unit by the Copper River Highway. To the east and across the Copper River is the Bering Lake inventoried area. Hinchinbrook-Hawkins inventoried area is separated from this unit by Orca Inlet. The Wrangell-Saint Elias National Park and Preserve Wilderness is about 50 miles to the northeast. The city of Cordova is just to the north of the area.

Non-Federal lands

There are 13,490 acres of state and private lands within the inventoried area. About 70 percent of these lands are adjacent to major road access. The other 30 percent can only be reached by water. Wilderness designation could affect access to these lands.

The surface estate of 3,850 acres was purchased using the EVOS restitution funds. The result is a split estate: the Federal government owns the surface estate on these lands, while the subsurface estate is retained by the Chugach Alaska Corporation and may be developed.

Legally established rights or uses

Land use authorizations

Special use authorizations in the area include outfitter/guide permits for rafting, camping, boat-based hiking, and big game hunting. There is a communication site on Heney Ridge, accessible by helicopter only. Mile 22 Communication Site, near the Copper River Highway, is accessible by a short hike. There are approximately 23 privately-owned isolated cabins that are used for recreational and subsistence purposes.

Minerals

There is low or no mineral activity in this area and no mining claims. The Forest Service currently has no plans of operations for mining activities, but mining activities may be occurring that do not require authorization.

Federal or state laws affecting availability as wilderness

The primary purpose of management in this area is for conservation of fish and wildlife and their habitat according to ANILCA 501(b).

Sheridan Glacier Inventoried Area

Gross acres: 316,210
National Forest System acres: 232,320

Apparent Naturalness

Appearance and Developments

The unit has a high level of natural integrity. Long-term ecological processes are intact and operating. Most of the area appears unmodified. Minor inclusions, such as recreation cabins and trails, are evident when one is close to them.

Ecological Conditions/Composition of Plant and Animal Communities

Vegetation

The vegetation composition and structure of this area is primarily the result of natural processes. Non-native plants are common in areas of human disturbance, especially near roads and along trails. The highly invasive aquatic plant elodea has been found in a number of locations in the area, including McKinley Lake, Wrong Way Pond, and Wooded Pond.

Fish Resource

Four of the five species of Pacific salmon (Chinook are absent) as well as Dolly Varden and cutthroat trout are represented in this area of diverse habitats. Although glaciers dominate the watersheds, there are several unique systems that are substantial producers of coho salmon, which are in part ground water fed by glacier meltwater that percolates through the gravels that have been deposited in wide valley floors. The habitat is in a relatively natural state, although the character of this area was altered as the result of the land uplift associated with the 1964 earthquake. There have been impacts to riparian areas alongside Ibeck Creek as a result of ATV traffic; however, efforts are underway to repair this damage. Elodea, an invasive aquatic plant is present and there is a high potential for its spread to other areas. Fishery impacts on these populations are thought to be at moderate levels. There are no hatchery salmon in this area other than sockeye salmon in transit to and from a large sockeye hatchery located 260 miles north in the upper Copper River watershed near Paxton. Overall, the natural character of the fish resources in this area have been "slightly impacted" by human influences.

Wildlife Resource

All native wildlife associated with the habitats in this roadless area are expected to be present in sustainable numbers, including the dominant predators (AKNHP 2013). None of the native terrestrial wildlife in this roadless area are proposed or listed in compliance with the ESA.

Moose were introduced to the Copper River area. Boreal toads have been observed historically along the southwestern portion of this area. The European black slug (*Arion* spp) is established in Cordova and may have moved into this inventoried area. Other than these potentially unnatural conditions on the edge of the area, wildlife are expected to retain natural interactions with each other and their environment with minimal human interference.

Opportunities for Solitude or Primitive and Unconfined Recreation

Opportunity for Solitude

The opportunity for solitude is high. There is a high level of topographic screening. The distance from the perimeter to the core is 7 to 14 miles.

Opportunity for Primitive Recreation

The opportunity for primitive recreation is moderate, with a low level of development away from the boundaries and moderate challenge and diversity of recreation opportunities. Much of the area, however, is regularly accessed by motor vehicles.

ROS Class	Acres
Primitive (P)	72,500
Semi-primitive Non-motorized (SPNM)	2,100
Semi-primitive Non-motorized (SPNMA)	100
Semi-primitive Motorized (SPM)	148,100
Roaded Natural (RN)	10

There are three recreation cabins within the unit and four moderately developed trails totaling approximately 10 miles.

Motor Vehicle Recreation

All of the area is open to motor vehicle access from December 1 to April 30, depending on snow conditions, except for the Power Creek drainage which is closed year-round to all motor vehicle use. Helicopter-assisted skiing takes place in the northeast part of the area. The Sheridan Glacier area also includes the largest segment the national forest open to all motor vehicle uses from May 1 to November 30. OHV use in this area is relatively common for subsistence and recreational purposes.

Other Values

Ecological, geological, or scenic features

There are four significant glaciers within the area: Scott, Sheridan, Sherman, and Childs glaciers. The Copper River Delta is the largest contiguous coastal wetland system along the West Coast of North America (Powers et al. 2002).

Cultural and historic features of value

There are two known sites within the area. The McKinley Trail Cabin is the oldest cabin within the national forest available for public use, and mine ruins with interpretation can be found near the McKinley Lake Cabin.

Features of scientific or educational value

The vast Copper River Delta has provided the setting for a variety of scientific studies and serves as a destination each year when hundreds of thousands of migratory birds pass through the area in late April and early May.

Manageability

Shape and configuration of the area

The exterior boundaries are fairly distinct where they follow topographic divides along the western and northern edge. The southern and eastern boundary is established by the Copper River Highway. Where the area abuts private or state land the boundaries are not distinct.

Management of adjacent lands

This unit is adjacent to the Tasnuna River inventoried area. It is separated from the Copper River Wetlands inventoried area to the south by the Copper River Highway. The Bering Lake inventoried area is across the Copper River Highway to the east. The Fidalgo-Gravina inventoried area is west of the area. The Wrangell-St. Elias National Park and Preserve Wilderness is about 10 miles to the northeast. The community of Cordova is in the western edge of the area.

Non-Federal lands

There are 93,360 acres of state and private lands within the inventoried area. About 60 percent of these lands are adjacent to major roads. The other 40 percent has only water access. Wilderness designation could affect these lands.

The surface estate of 9,400 acres near Eyak Lake was purchased using the EVOS restitution funds. The result is a split estate: the Federal government owns the surface estate on these lands, while the subsurface estate is retained by the Chugach Alaska Corporation and may be developed.

Legally established rights or uses

Land use authorizations

Special use authorizations in the area include outfitter/guide permits for rafting, camping, and hiking. The area is also being analyzed for winter recreation activities. There are also seismic and telemetry stations within the area.

Minerals

There is low or no mineral activity in this area and no mining claims. The Forest Service currently has no plans of operations for mining activities, but mining activities may be occurring that do not require authorization. In the portion of the area added by ANILCA, minerals are managed under ANILCA requirements (hardrock leasable), not under the 1872 Mining Law (locatable).

Federal or state laws affecting availability as wilderness

ANILCA 501(b) added the eastern portion of this area to the Chugach National Forest in 1980 and directs that conservation of fish and wildlife and their habitat be the primary purpose of management.

Bering Lake Inventoried Area

Gross acres: 1,032,730
National Forest System acres: 957,460

Apparent Naturalness

Appearance and Developments

This area has a very high degree of natural integrity. Most long-term ecological processes are intact and operating. While some evidence of human activity exists (e.g., mining operations, old railroad bed, and cabins), these activities have had little or no effect on the natural appearance of the area. There was an oil-drilling rig that was transported across an existing road near Katalla in the late 1980s. Drilling for oil and gas has been taking place since the turn of the century. Most of the area appears unmodified.

Ecological Conditions/Composition of Plant and Animal Communities

Vegetation

The vegetation composition and structure of this area is primarily the result of natural processes. The highly invasive aquatic plant elodea has been found in a number of locations in the area including Martin and Bering lakes. Other than elodea, non-native plants are rare in the area.

Fish Resource

All five species of Pacific salmon as well as Dolly Varden and cutthroat trout are present in this area of diverse habitats. In addition, anadromous runs of rainbow trout (steelhead) are present; perhaps the only substantial occurrence of the anadromous form of this species within the Chugach National Forest. Although glaciers dominate the watersheds, there are several unique systems that are substantial producers of coho and sockeye salmon, which are in part groundwater fed by glacier meltwater that percolates through the gravels of wide valley floors. The character of this area was substantially changed as a result of the land uplift associated with the 1964 earthquake; however, natural processes dominate the existing aquatic habitat. Elodea, an invasive aquatic plant, has recently been confirmed in this area and there is potential for its spread. Fishery impacts on these populations are thought to be at moderate levels. There are no hatchery salmon in this area other than sockeye salmon in transit to and from a large sockeye hatchery located 260 miles north in the upper Copper River watershed near Paxton. , the fish resources in this area, although in transition as a result of the 1964 earthquake, have had little impact from humans and probably are in a "nearly natural" state.

Wildlife Resource

All native wildlife associated with the habitats in this roadless area are expected to be present in sustainable numbers, including the dominant predators (AKNHP 2013). None of the native terrestrial wildlife in this roadless area are proposed or listed in compliance with the ESA. Wildlife are expected to retain natural interactions with each other and their environment with minimal human interference.

Wolverine, brown bear, moose, mountain goats, trumpeter swans, dusky Canada geese, and bald eagles make this a popular area for national forest visitors. Although these species are not "unusual" for this region, wildlife is abundant in this area. The barrier islands provide some unique habitats for wildlife not found in many other places. OHV use on the small barrier islands adjacent to the mainland likely has an impact on migratory birds, primarily during April and May. Bering Lake is a shallow and sheltered lake that supports habitat for hundreds of swans, geese, and ducks and provides sheltered areas for summer molting.

Opportunities for Solitude or Primitive and Unconfined Recreation

Opportunity for Solitude

The opportunity for solitude in this area is outstanding. The area is very large, has a high level of topographic screening and few permanent off-site intrusions. The distance from the perimeter to the core is about 15 miles. Exceptions to this are found in areas popular with summer motor vehicle use, mostly on the small barrier islands and a few areas near the Copper River Highway.

Opportunity for Primitive Recreation

The opportunity for primitive recreation is high, with a high level of challenge for the recreation user, a diversity of recreation opportunities, and few or no developments in most of the area. Because of the remote nature of this area, however, access is primarily through power boats and airplanes instead of human-powered means. There are two public use cabins within the area. Although the Copper River Highway abuts a part of the western boundary, there are only a few primitive trails serving as access points from the road. With the Copper River Highway closed at mile 36, access is even more limited.

ROS Class	Acres
Primitive (P)	900,800
Semi-primitive Non-motorized (SPNMA)	21,400
Semi-primitive Motorized (SPM)	25,400
Roaded Natural (RN)	9,900

Motor Vehicle Recreation

Motor vehicle use consists of watercraft, such as jet boats and airboats and motorboats, as well as float planes, which provide access into this area along waterways and lakes. Snowmachine use is allowed in most of the area from December 1 to April 30, snow permitting. About half of the area is also open to helicopters in the winter. From May 1 to November 30, almost all of the area is closed to motor vehicle use except for subsistence. Exceptions to this are on the small islands where motor vehicle use is allowed in non-vegetated areas only, and on Long Island in the center of the delta, where motor vehicle use is allowed. Mile 27 sand dunes are a popular destination for OHV riders. Access to most of this area is by boat or floatplane.

Other Values

Ecological, geological, or scenic features

The Copper River Delta is the largest contiguous coastal wetland system along the West Coast of North America (Powers et al. 2002). The Copper River Delta, including the barrier islands, provides an essential spring stopover area for millions of migrating shorebirds, including most of the world's population of dunlins and western sandpipers (Bishop et al. 2000). It also provides essential fall migratory habitat for tule white-fronted geese and nesting habitat for nearly all dusky Canada geese, a species recommended for species of conservation concern in the Assessment (USDA 2014).

The Sitka Spruce Floodplain Old-Growth Plant Association, Barrier Islands, Uplifted Tidal Marsh, and Tidal Marshes and Mudflats biophysical settings are considered of conservation concern by the Alaska Natural Heritage Program and occur in the area (Boggs et al. 2014). The area features high ecological diversity including three provinces, three sections, and four subsections. Populations of the Alaska Region sensitive plant Unalaska mist-maid (*Romanzoffia unalaschcensis*) occur in the area.

Cultural and historic features of value

There are 45 known cultural sites within the area. Vitus Bering made first landfall in Alaska at Kayak Island in 1741. In the early 1900s, prospects for oil development and a railroad from Katalla to the Kennicott Mine brought over 2,000 people to Katalla. Evidence of the old railroad, log cabins, oil wells, and the refinery are still abundant. Controversy over development in this area led to the dismissal of the first Chief of the Forest Service in 1916. Oil was produced from a small field until the late 1930s.

Features of scientific or educational value

This area has exceptional scientific value as a laboratory to learn the transition response of a very large, productive wetland to a very large natural disturbance, the uplift from the 1964 earthquake. In addition, there are unique opportunities to study the impact of climate change on aquatic and riparian ecosystems. Dusky Canada geese have been studied on the Copper River Delta for decades, and the research provides a history of a species that has endured despite massive habitat changes related to earthquakes and historic overhunting in the lower 48.

Manageability

Shape and configuration of the area

The national forest boundary forms the northern and eastern edge of the area. This boundary is not clearly delineated on the ground. The western edge is the buffer along the Copper River Highway and the eastern bank of the Copper River. The southern edge is the Gulf of Alaska. State land below mean high tide is not clearly defined on the ground. Native corporation selections along the western edge may make the western boundary difficult to locate on the ground. Native corporation land in the Carbon Mountains area on the eastern side of the unit is not clearly delineated on the ground. An easement was issued to Chugach Alaska Corporation for access to their private lands.

Management of adjacent lands

The Wrangell-St. Elias National Park to the north is a wilderness area. East of the unit are the Sheridan Glacier, Copper River Wetlands, and Tasnuna River inventoried areas. The Copper River Highway separates the Bering Lake inventoried area from the Sheridan Glacier inventoried area.

Non-Federal lands

There are 66,500 acres of private and state land in the area. Wilderness designation could affect access to these lands. In 1982, the Chugach Natives, Inc., an Alaska Native corporation that is now known as Chugach Alaska Corporation (CAC), entered into a settlement agreement (the CNI Agreement) with the United States and the State of Alaska regarding its selection rights under the Alaska Native Claims Settlement Act. Under the CNI Agreement, CAC obtained certain limited rights to explore, develop and produce oil and gas in the Katalla area and a right of access across National Forest System lands to the Bering River coal field located on the Carbon Mountain tract of CAC lands. An easement was issued to CAC on March 9, 2000 for the route depicted as running generally from the Copper River Highway (Alaska Route 10) to the coal fields. This road is known as the Carbon Mountain Road. The acres encumbered by the access rights are not included in the inventoried area.

Legally established rights or uses

Land use authorizations

Special use authorizations in the area include outfitter/guide permits for rafting, camping, freshwater fishing, and big game hunting. There are also seismic and telemetry stations within the area.

Minerals

There is low or no mineral activity in this area and no mining claims. The Forest Service currently has no plans of operations for mining activities, but mining activities may be occurring that do not require authorization. In the portion of the area added by ANILCA, minerals are managed under ANILCA requirements (hardrock leasable), not under the 1872 Mining Law (locatable).

Federal or state laws affecting availability as wilderness

ANILCA 501(b) added a portion of this area to the Chugach National Forest in 1980 and directs that conservation of fish and wildlife and their habitat be the primary purpose of management in this entire inventoried area.

Tasnuna River Inventoried Area

Gross acres: 438,890
National Forest System acres: 342,920

Apparent Naturalness

Appearance and Developments

This area has a very high degree of natural integrity. Most long-term ecological processes are intact and operating. Most of the area appears unmodified.

Ecological Conditions/Composition of Plant and Animal Communities

Vegetation

The vegetation composition and structure of this area is primarily the result of natural processes. Non-native plants are rare in the area.

Fish Resource

Three Pacific Salmon species are found within the fish production waters that are within this area (Chinook, coho, and sockeye salmon). Dolly Varden char are also present. Glaciers dominate the watersheds in this area. The habitat is in a relatively natural state. Fishery impacts on these populations are thought to be at moderate levels. There are no hatchery salmon in this area other than perhaps sockeye salmon in transit to and from a large sockeye hatchery located 260 miles north in the upper Copper River watershed. Overall, the fish resources in this area have had little impact from humans and probably are in a "nearly natural" state.

Wildlife Resource

All native wildlife associated with the habitats in this roadless area are expected to be present in sustainable numbers, including the dominant predators (AKNHP 2013). None of the native terrestrial wildlife in this roadless area are proposed or listed in compliance with the ESA. Wildlife are expected to retain natural interactions with each other and their environment with minimal human interference.

Opportunities for Solitude or Primitive and Unconfined Recreation

Opportunity for Solitude

The opportunity for solitude in this area is outstanding. The area is very large and has a high level of topographic screening and no permanent off-site intrusions. The distance from the perimeter to the core is 12 to 14 miles. Access is extremely difficult. The only points of access, except by air, are along the rivers by watercraft, where easement sites and trails provide access to National Forest System lands.

Opportunity for Primitive Recreation

The opportunity for primitive recreation is moderate to high, with a high level of challenge for the recreation user and virtually no developments in the area. The entire area is inventoried in the Primitive ROS class. Access, however, is often by motor vehicles. There are no recreation cabins or established trails within the unit.

Motor Vehicle Recreation

The area is open to motor vehicle access from December 1 to April 30, depending on snow conditions. Helicopter-assisted skiing is permitted in a portion of the area. From May 1 to November 30, helicopter

access is allowed but not OHVs. Aerial observations and discussions with residents of Valdez suggest that snowmachine use is common in this area.

Other Values

Ecological, geological, or scenic features

Outstanding icefields, glaciers, and rugged peaks cover much of this area. Mountain goats, a species of high public interest, can be observed in this inventoried area.

Cultural and historic features of value

There are five known cultural sites within the area.

Features of scientific or educational value

A research natural area was proposed in the 1984 Forest Plan at the Schwan Glacier terminus to represent a thinning and retreating alpine glacier but was not designated.

Manageability

Shape and configuration of the area

The national forest boundary forms three sides of the area. The watershed divide to the Sheridan Glacier forms the southern edge. Private land along the Copper and Tasnuna rivers are not well delineated and are difficult to identify on the ground. The northern most portion of the unit is separated from the southern part by private land along the Wernicke River.

Management of adjacent lands

The unit is surrounded by undeveloped Federal and private land. A wilderness area within Wrangell-St. Elias National Park is to the northeast of the unit. The Bering Lake inventoried area is to the east and the Sheridan Glacier inventoried area is to the south.

Non-Federal lands

There are 96,320 acres of private and state land in the area. Most of the state and Alaska Native Corporation selections occur along the major river drainages, where access is predominantly by boat.

Legally established rights or uses

Land use authorizations

Special use authorizations in the area include outfitter/guide permits for big game hunting, tour skiing, heli-skiing, and camping. The area is being analyzed for additional winter recreation activities.

Minerals

There is low or no mineral activity in this area and no mining claims. The Forest Service currently has no plans of operations for mining activities, but mining activities may be occurring that do not require authorization. In the portion of the area added to the Chugach National Forest by ANILCA, minerals are managed under ANILCA requirements (hardrock leasable), not under the 1872 Mining Law (locatable).

Federal or state laws affecting availability as wilderness

ANILCA 501(b) added this area to the Chugach National Forest in 1980 and directs that conservation of fish and wildlife and their habitat be the primary purpose of management.

Literature Cited

Adams, J. (2002). *Prince William Sound biological hot-spots workshop report*. Anchorage, AK: National Wildlife Federation.

ADF&G. 2006. Our wealth maintained. A strategy for conserving Alaska's diverse wildlife and fish resources. Alaska Department of Fish and Game, Juneau, Alaska. xviii+824pp.

ADF&G. 2015a. Top 10 birding hotspots in Alaska. Retrieved from undated bird viewing/birding hotspots/Copper River Delta website, accessed 2/16/15. Alaska Department of Fish and Game:

ADF&G. 2015b. Prince William Sound wildlife viewing. Retreived on 2/14/15 (http://www.adfg.alaska.gov/index.cfm?adfg=viewinglocations.Prince William Sound) Alaska Department of Fish and Game.

ADF&G, USDA, USFWS. 2003. Kenai Peninsula Caribou Management Plan 2003. Alaska Departmernt of Fish and Game, USDA Forest Service, U.S. Fish and Wildlife Service.

Alaska Department of Natural Resources (ADNR). 1995. Management plan for state marine parks: Prince William Sound and Resurrection Bay. Anchorage, AK: Alaska Department of Natural Resources, Division of Parks and Outdoor Recreation. 211p.

Alaska Department of Natural Resources (AKDNR). 2013. Retrieved from *Elodea* website 02/18/15). Alaska Department of Natural Resources, Division of Agriculture http://dnr.alaska.gov/ag/ag_*Elodea*.htm.

AKNHP (2013) Species expected to be present within the boundaries of the Chugach National Forest. Retrieved from the Alaska Natural Heritgage Program Biotics 2/15/2013. Alaska Natural Heritage Program. (http://aknhp.uaa.alaska.edu/maps-js/integrated-map/biotics.php#map?lg=5d60b854-cfd0-11e3-a3a1-00219bfe5678&p=proj3857&b=google_hybrid&z=4&ll=60.00000%2C-150.00000)

Araki, H., Berejikian, B. A., Ford, M. J., and Blouin, M. S. (2008). Fitness of hatchery-reared salmonids fish in the wild. Evolutionary Applications, 1(2), 342-355.

Bishop, M.A. and P. M. Meyers. 2000. A method to estimate migrant shorebird numbers on the Copper River Delta. J. Field Ornithology. 71(4) 627-637.

Brenner, R. E., Moffitt, S. D., and Grant, W. S. (2012). Straying of hatchery salmon in Prince William Sound, Alaska. *Environmental Biology of Fishes, 94*, 179-195.

Buhle, E. R., Holsman, K. K., Scheuerell, M. D., and Albaugh, A. (2009). Using an unplanned experiment to evaluate the effects of hatcheries and environmental variation on threatened populations of wild salmon. Biological Conservation, 142(11), 2449-2455.

Cederholm, C. J., Kunze, M. D., Murota, T., and Sibatani, A. (1999). Essential contributions of nutrients and energy for aquatic and terrestrial ecosystems. Fisheries, 24(10), 6-15.

Chilcote, M. W., Gooson, K., and Falcy, M. R. (2011). Reduced recruitment performance in natural populations of anadromous Salmonids associated with hatchery-reared fish. Canadian Journal of Fisheries and Aquatic Sciences, 68, 511-522.

Cline, D. (2005). *Special ecological sites in Alaska's eastern Prince William Sound & Copper River Delta*. National Wildlife Federation, Anchorage, Alaska.

EVOS TC (2014), Status of injured Resources and Services. *Exxon Valdez* Oil Spill Trustee Council. November 2014. Accessed online at http://www.evostc.state.ak.us/index.cfm?FA=status.injured

Exxon Valdez Oil Spill Trustee Council (EVOSTC). (2015). EVOS Shoreline Oiling interactive GIS map retrieved 2_16_15 from *Exxon Valdez* Oil Spill Trustee Council. (http://portal.aoos.org/gulf-of-alaska.php#module-metadata/ad71223c-ea24-11e0-95b6-0019b9dae22b/ee8a32fe-ea24-11e0-987e-0019b9dae22b).

Ford M.J. 2002. Selection in captivity during supportive breeding may reduce fitness in the wild. Cons Biol 16:815–825.

Gotthardt, T.A., K. M. Walton, and T.L. Fields. 2012. Setting prioirities for Alaska's Wildlife Action Plan. Alaska Natural Heritage Program. University of Alaska Anchorage, AK. 46 pp.

Hartzell, P.L., J. V. Nghiem, K. J. Richio and D.H. Shain. 2005. Distribution and phylogeny of glacier ice worms (*Mesenchytraeus solifugus* and *Mesenchytraeus solifugus rainierensis*) Can. J. Zool. 83: 1206–1213

Helfield, J. M., and Naiman, R. M. (2001). Effects of salmon-derived nitrogen on riparian forest growth and implications for stream productivity. Ecology, 82(9), 2403-2409.

Hennon, P.E., and Trummer, L.M. (2001). Yellow-cedar (Chamaecyparis nootkatensis) at the northwest limits of its natural range in Prince William Sound, Alaska. *Northwest Science 75*, 61-71.

Hobbs RC, Shelden KEW, Vos DJ, Goetz KT, Rugh DJ. 2006. Status review and extinction assessment of Cook Inlet belugas (Delphinapterus leucas). AFSC Processed Rep. 2006-16, 74 p. Alaska Fish. Sci. Cent., NOAA, Natl. Mar, Fish. Serv., 7600 Sand Point Way NE, Seattle WA 98115.

Irvine, J. R., and Riddell, B. E. (2007). Salmon as status indicators for North Pacific ecosystems. N. Pac. Anadr. Fish Comm. Bulletin, 4, pp. 285-287.

IUCN. 2004. Red List. International Union for the Conservation of Nature. Accessed online 02/13/14 http://www.iucnredlist.org/details/3179/0.

Lance, Ellen Weintraub. 2002. Montague Island vole: a conservation assessment. Gen. Tech. Rep. PNW-GTR-542. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 14 p.

Lance, Ellen Weintraub. 2002b. Montague Island marmot: a conservation assessment. Gen. Tech. Rep. PNW-GTR-541. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 12 p.

Leider, S. A., Hulett, P. L., Loch, J. J., and Chilcote, M. W. (1990). Electrophoretic comparison of the reproductive success of naturally spawning transplanted and wild steelhead trout through the returning adult stage. Aquaculture, 88(3-4), 239-252.

Michel, J. and Esler, D. (2010). Summary of lingering oil studies funded by the *Exxon Valdez* Oil Spill Trustee Council.

Mobrand L.E., Barr J., Blankenship L., Campton D.E., Evelyn T.T.P.,Flagg T.A., Mahnken C.V.W, Seeb L.W., Seidel P.R., Smoker WW(2005) Hatchery reform in Washington State: principles and emerging issues. Fisheries 30:11–39.

Pacific Coast Joint Venture (2003). Pacific Coast Joint Venture Strategic Plan, Alaska State Component Focus Areas 14.0-17.0. October 2003.

Poe, A., Gimblett, H.R. and Itami, R.M. 2010. Evaluating the Recreation Service Recovery: Evaluation of Prince William Sound User Experience, *Exxon Valdez* Oil Spill Restoration Project Final Report, USDA Forest Service, Chugach National Forest, Anchorage, Alaska. 87p. Available online at http://www.fs.usda.gov/detail/chugach/landmanagement/planning/?cid=stelprdb5143541. Accessed 3/5/2015.

Potkin, M. (1997). *Fire History Disturbance Study of the Kenai Peninsula Mountainous Portion of the Chugach National Forest*. Anchorage, AK: Unpublished Report. On file with: U.S. Department of Agriculture, Forest Service, Chugach National Forest.

Powers, S.P., Bishop, M.A., Grabowski, J.H., Petersen, C.H. 2002. Intertidal benthic resources of the Copper River Delta, Alaska, USA. Journal of Sea Research 42(1): 13-23. Available online at http://www.sciencedirect.com/science/article/pii/S1385110101001022
Suring, L.H. and Poe, A.J. 2010. Assessment of human use and associated risk to sensitive resources in Prince William Sound, Alaska, USA. Northern Ecologic L.L.C. Technical Bulletin 2010-6. Available online at http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5434943.pdf. Accessed 3/5/2015.

Rinella, D. J., Wipfli, M. S., Stricker, C. A., Heintz, R. A., and Rinella, M. J. (2012). Pacific salmon (oncorhynchus spp.) runs and consumer fitness: growth and energy storage in stream-swelling salmonids increase with salmon spawner density. Can. J. Fish. Aquat. Sci., 69, 73-84.

USDA. (1989). Big Island Management Area, final environmental impact statement. R10-MB-76. Anchorage, AK: U.S. Department of Agriculture, Forest Service, Chugach National Forest.

USDA. (1997). *Designation order for the Green Island research natural area on the Chugach National Forest, Cordova Ranger District*. Anchorage, AK: U.S. Department of Agriculture, Forest Service, Alaska Region.

USDA. (2007a). *Designation order for the Copper Sands research natural area on the Chugach National Forest, Cordova Ranger District*. Anchorage, AK: U.S. Department of Agriculture, Forest Service, Alaska Region.

USDA. (2007b). *Designation order for the Kenai Lake-Black Mountain research natural area on the Chugach National Forest, Seward Ranger District*. Anchorage, AK: U.S. Department of Agriculture, Forest Service, Alaska Region.

USDA. (2007c). *Designation order for the Olsen Bay Creek research natural area on the Chugach National Forest, Cordova Ranger District*. Anchorage, AK: U.S. Department of Agriculture, Forest Service, Alaska Region.

USDA. (2007d). *Designation order for the Wolverine Glacier research natural area on the Chugach National Forest, Glacier Ranger District*. Anchorage, AK: U.S. Department of Agriculture, Forest Service, Alaska Region.

USDA. (2012).Wilderness character annual monitoring report. Anchorage, AK: unpublished report. On file with: U.S. Department of Agriculture, Forest Service, Chugach National Forest.

USDA. (2013).Wilderness character annual monitoring report. Anchorage, AK: unpublished report. On file with: U.S. Department of Agriculture, Forest Service, Chugach National Forest.

USDA Forest Service, Chugach National Forest, U.S. Fish and Wildlife Service Kenai Wildlife Refuge. Alaska Department of Fish and Game. (2013). Managing Human-bear conflicts Kenai-Russian River Area: five year Action plan 2013-2017.

Weintraub, E.; Cook, J.A. 1991. Taxonomic status and ecology of the Montague Island tundra vole (*Microtus oeconomus elymocetes*). Report on file with: Cordova Ranger District, Chugach National Forest, Cordova, AK 99574.

Welker, J., Hayward, G., Spalinger, D., DeVelice, R., Causey, D., Novy, M., Rainey, F.A., Boario, S., and Poe, A. (2012). *The 3RIVERS watershed research, education, and outreach initiative: A place--based program of the natural campus partnership*. Anchorage, AK: Unpublished Report. On file with: University of Alaska-Anchorage and U.S. Department of Agriculture, Forest Service, Chugach National Forest.